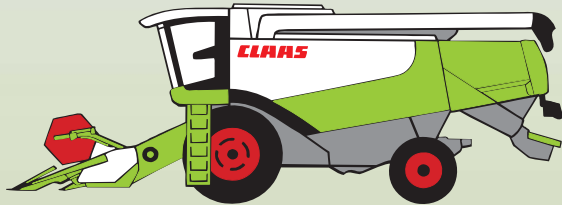


# ***CLAAS***



**LEXION 580 – 510**

## **Technical Systems**

## **Hydraulic System**

## ***SERVICE & PARTS***



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**1****Hydraulic System  
- General**

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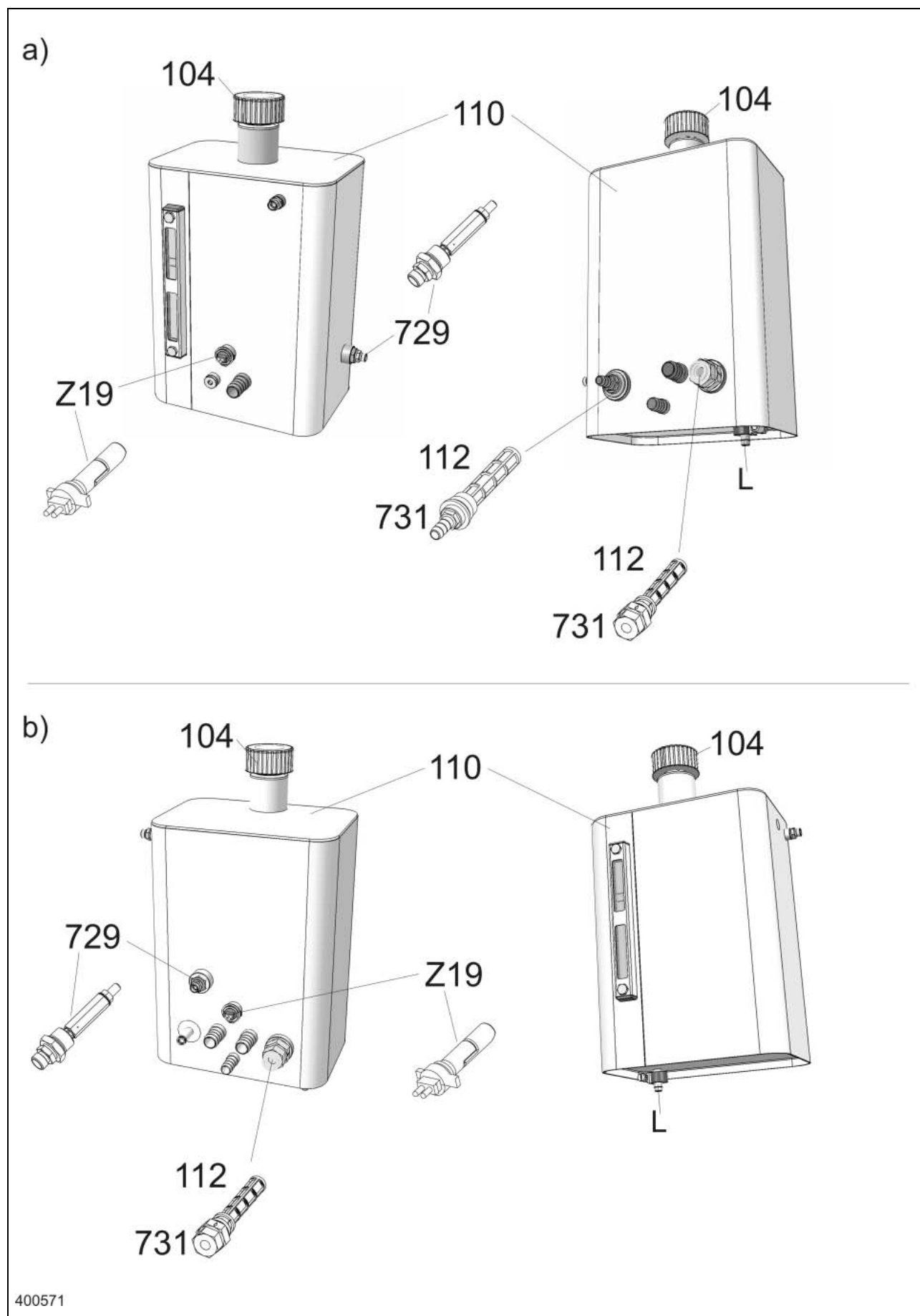


## 1.1

### Hydraulic System - General

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## 1.1.1 Oil Tank (entire hydraulic system)



**Key to diagram:**

104	Vent opening
110	Oil tank
112	Return filter (with return line valve)
729	Low-pressure hydraulic system pressure relief valve ..... $19^{+4}$ bar
731	Return line valve (non-return valve)
Z19	Hydraulic oil level actual value switch (min.)
a)	Tank version for LEXION 570-510
b)	Tank version for LEXION 580
L)	Oil drain

**Oil specifications:**

Filling quantities:	Hydraulic system, total	= approx. 70 litres (depending on components fitted)
	Hydraulic oil tank	= approx. 20 litres

**Oil change:** Once a year or after 500 operating hours.  
Check oil only with cutterbar cylinders retracted!

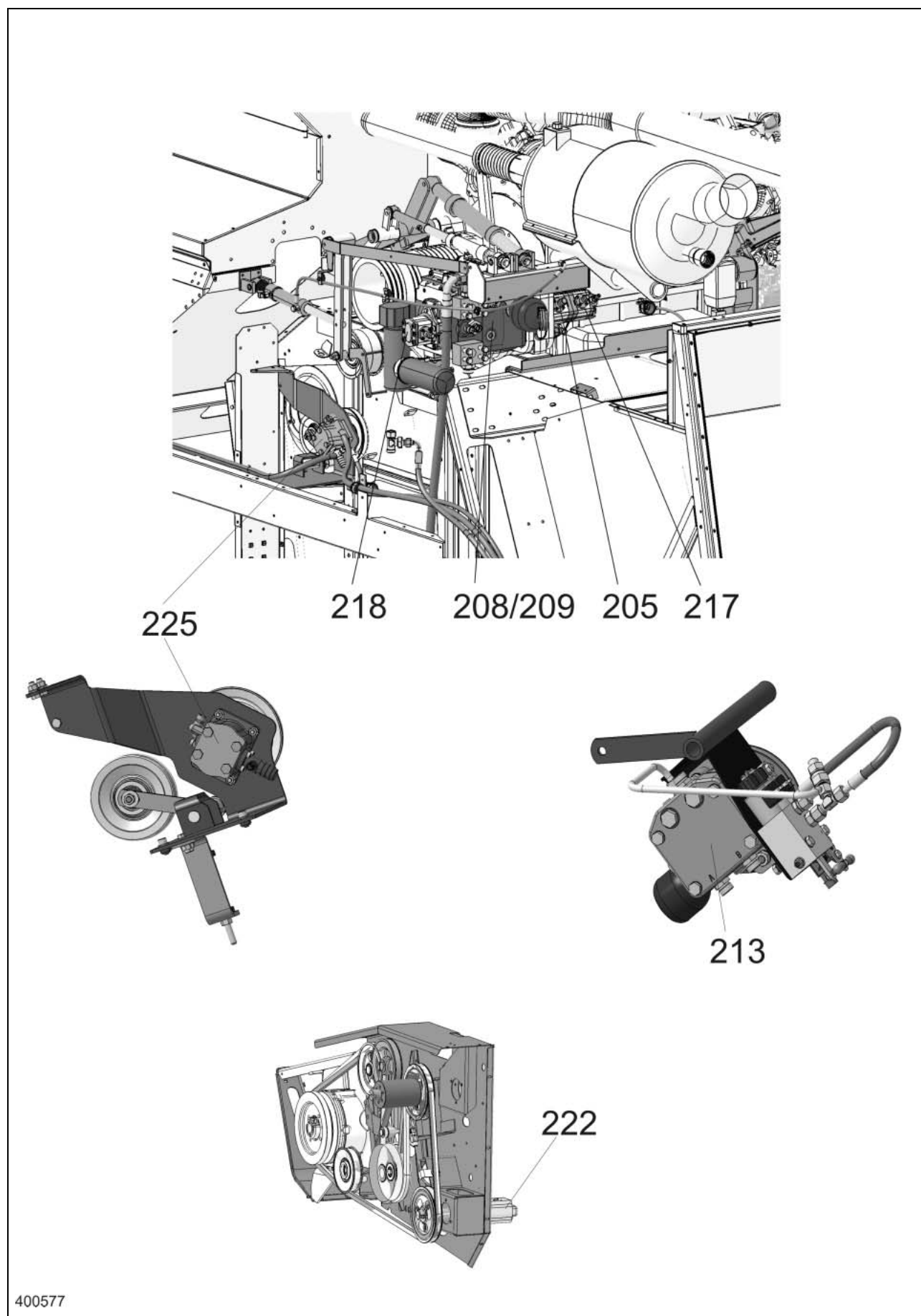
Oil filter:	Working hydraulics	= Sieve filter in tank (100 µm)
	Steering	= Sieve filter in tank (100 µm)
	Ground drive	= Filter cartridge (10 µm)

Change filters once a year or after 500 operating hours.

Oil pressure:	Working hydraulics	= $180^{+15}$ bar	Circulation press.	$3^{+6}$ bar
	Steering	= $160^{+15}$ bar	Circulation press.	$10^{+7}$ bar
	Low-pressure hydr. circuit	= $19^{+4}$ bar		
	Reel drive	= $160^{+15}$ bar		
	Rotary chaff screen	= 150 bar		
	Ground drive high pressure	= $420^{+30}$ bar		
	Ground drive feed pressure	= $30^{+2}$ bar		
	Chaff spreader / straw spreader	= $150^{+15}$ bar		
	Uni-spreader fan	= $55^{+15}$ bar		

**Note:** The figures above refer to measurements made at diesel engine rated speed and a hydraulic oil temperature of approx. 60°C.

## 1.1.2 Hydraulic Pumps



**Key to diagram:**

205	Working hydraulics pump
208/209	Ground drive pump (with ground drive feed pump)
213	Reel drive pump
217	Rotary chaff screen pump
218	Steering hydraulics pump
222	Rape cutter drive pump
224	Chaff / straw spreader drive pump
225	Uni-spreader fan drive pump
243	Radial spreader disc drive pump
247	Chaff spreader fan pump

**Working hydraulics**

LEXION 580 - 540	Drive $n_{\max}$ = 2640 rpm Drive $n_{\text{rated}}$ = 2539 rpm Volumetric displacement = 48 l/min at 19 cm <sup>3</sup>
LEXION 530 - 510	Drive $n_{\max}$ = 3004 rpm Drive $n_{\text{rated}}$ = 2889 rpm Volumetric displacement = 40 l/min at 14 cm <sup>3</sup>

**Steering hydraulics**

LEXION 580 - 540	Drive $n_{\max}$ = 2640 rpm Drive $n_{\text{rated}}$ = 2539 rpm Volumetric displacement = 28 l/min at 11 cm <sup>3</sup>
LEXION 530 - 510	Drive $n_{\max}$ = 3004 rpm Drive $n_{\text{rated}}$ = 2889 rpm Volumetric displacement = 23 l/min at 8 cm <sup>3</sup>

**Uni-spreader fan**

LEXION 580	Drive $n_{\max}$ = 2623 rpm Drive $n_{\text{rated}}$ = 2522 rpm Volumetric displacement = 14 l/min at 5.5 cm <sup>3</sup>
------------	---

**Chaff spreader**

LEXION 570	Drive $n_{\max}$ = 2623 rpm Drive $n_{\text{rated}}$ = 2522 rpm Volumetric displacement = 20 l/min at 8 cm <sup>3</sup>
LEXION 530 - 510	Drive $n_{\max}$ = 2623 rpm Drive $n_{\text{rated}}$ = 2522 rpm Volumetric displacement = 20 l/min at 8 cm <sup>3</sup>

**Straw spreader**

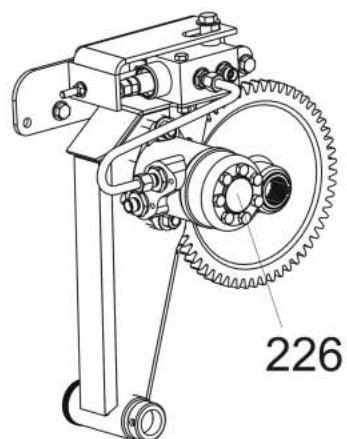
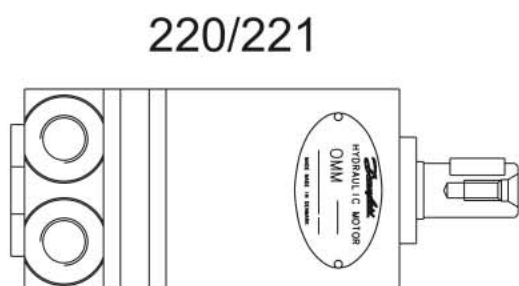
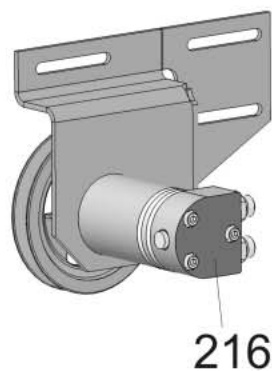
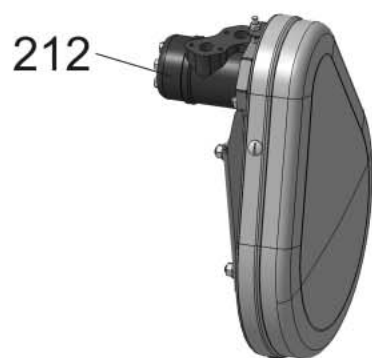
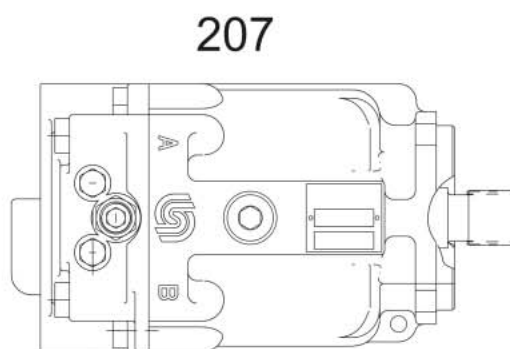
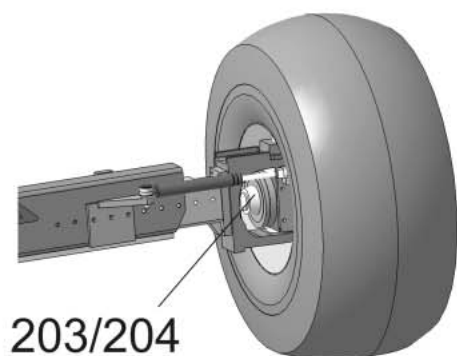
LEXION 570 - 540	Drive $n_{\max}$ = 2623 rpm Drive $n_{\text{rated}}$ = 2522 rpm Volumetric displacement = 20 l/min at 8 cm <sup>3</sup>
LEXION 530 - 510	Drive $n_{\max}$ = 2623 rpm Drive $n_{\text{rated}}$ = 2522 rpm Volumetric displacement = 20 l/min at 8 cm <sup>3</sup>

<b>Radial spreader</b>	LEXION 570	Drive $n_{\max}$ = 2623 rpm	80 l/min at 32 cm <sup>3</sup>
		Drive $n_{\text{rated}}$ = 2522 rpm	
		Volumetric displacement =	
<b>Chaff spreader fan</b>	LEXION 570	Drive $n_{\max}$ = 2623 rpm	35 l/min at 14 cm <sup>3</sup>
		Drive $n_{\text{rated}}$ = 2522 rpm	
		Volumetric displacement =	
<b>Reel drive</b>	LEXION 580 - 510	Drive $n_{\max}$ = 2912 rpm	max. 42 l/min at 15 cm <sup>3</sup>
		Drive $n_{\text{rated}}$ = 2800 rpm	
		Volumetric displacement =	
<b>Rotary chaff screen drive</b>	LEXION 580 - 540	Drive $n_{\max}$ = 2640 rpm	15 l/min at 6 cm <sup>3</sup>
		Drive $n_{\text{rated}}$ = 2539 rpm	
		Volume =	
	LEXION 530 - 510	Drive $n_{\max}$ = 3004 rpm	17 l/min at 6 cm <sup>3</sup>
		Drive $n_{\text{rated}}$ = 2889 rpm	
		Volumetric displacement =	
<b>Ground drive</b>	LEXION 580 - 540	Drive $n_{\max}$ = 2640 rpm	330 l/min at 130 cm <sup>3</sup>
		Drive $n_{\text{rated}}$ = 2539 rpm	
		Volumetric displacement =	
	LEXION 530 - 510	Drive $n_{\max}$ = 3004 rpm	288 l/min at 100 cm <sup>3</sup>
		Drive $n_{\text{rated}}$ = 2889 rpm	
		Volumetric displacement =	





## 1.1.3 Hydraulic Motors



**Key to diagram:**

203/204	4 -Trac radial piston motor, left / right
207	Ground drive fixed displacement motor
212	Reel drive motor
216	Rotary chaff screen drive motor
226	Front attachment reverser drive motor
220/221	Rape cutter drive left / right motor

**4-Trac (All-wheel drive)**LEXION 580 - 540      Volume      =    1250 cm<sup>3</sup>LEXION 530 - 510      Volume      =    1250 cm<sup>3</sup>**Ground drive**LEXION 580      Drive n<sub>max</sub>      =    3436 rpmDrive n<sub>rated</sub>      =    3304 rpm

20 km/h      =    2326 rpm

LEXION 580 MTS      20 km/h      =    2659 rpm

Volume      =    100 cm<sup>3</sup>LEXION 570 - 540      Drive n<sub>max</sub>      =    3433 rpmDrive n<sub>rated</sub>      =    3301 rpm

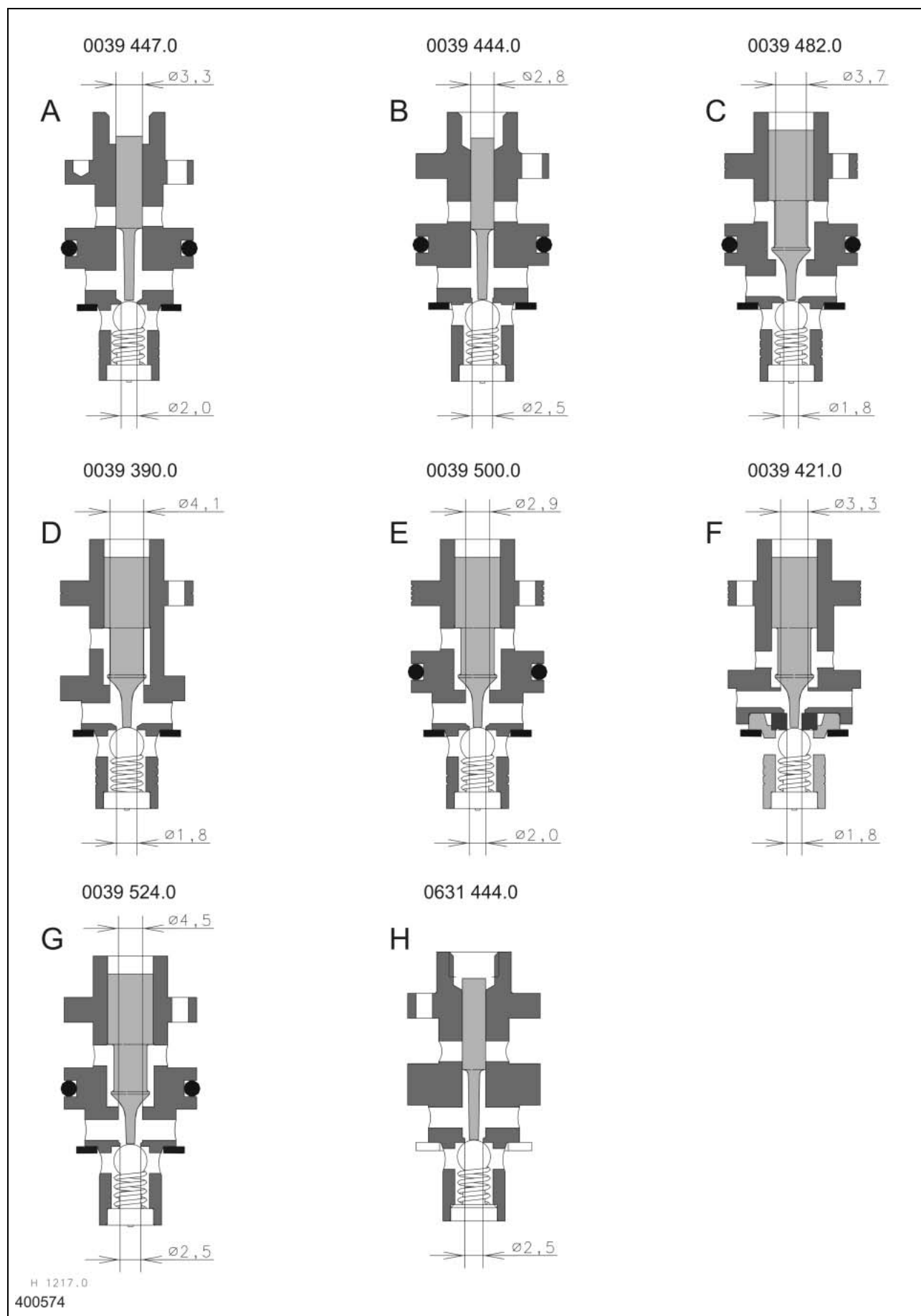
20 km/h      =    2465 rpm

Volume      =    100 cm<sup>3</sup>LEXION 530 - 510      Drive n<sub>max</sub>      =    3004 rpmDrive n<sub>rated</sub>      =    2889 rpm

20 km/h      =    2094 rpm

Volume      =    100 cm<sup>3</sup>**Reel drive**LEXION 580 - 510      Volume      =    160 cm<sup>3</sup>**Rotary chaff screen drive**LEXION 580 - 510      Volume      =    12.5 cm<sup>3</sup>**Reversing drive**LEXION 570 - 510      Volume      =    200 cm<sup>3</sup>**Chaff spreader**LEXION 570 - 510      Volume      =    19 cm<sup>3</sup>**Straw spreader**LEXION 570 - 510      Volume      =    19 cm<sup>3</sup>

## 1.1.4 Valve Inserts



**Valve Inserts:**

Item	Application	Marking at top	Marking at bottom	Spare part no.
A	Autopilot	None	2	0039 447.0
B	Threshing drum fast Concave wide (only LEXION 580/570) Feeder speed fast Rotor speed fast (only LEXION 580/570) Swing grain tank unloading tube in/out Fold straw guide plate / uni-spreader Lock / unlock cutterbar springs Reel forward/backward Raise reel Extend/retract Vario table Cutterbar cross levelling Reverse pilot valve Fold cutterbar in/out Grain tank unloading aid	None	None	0039 444.0
C	Quick stop	2	3	0039 482.0
D	Lower reel	1	3	0039 390.0
E	Concave narrow / wide (only LEXION 560-510)	4	2	0039 500.0
F	Threshing drum slow Feeder slow Concave narrow (only LEXION 580/570) Rotor slow (only LEXION 580/570)	3	3	0039 421.0
G	Uni-spreader control (only Lexion 580)	None	None	0039 524.0
H	Fold maize picker Extend/retract snapping plates	None	None	0631 444.0

**Note:** When removing and replacing the valve inserts A - G, the sheet gasket **0084 076.0** (black) must also be replaced.

When removing and replacing valve insert H, the sheet gasket **0094 001.0** (copper) must also be replaced.

In case of doubt, always use the sheet gasket **0084 076.0** (black)!



## 1.2

### Overall Hydraulic System Circuit Diagram

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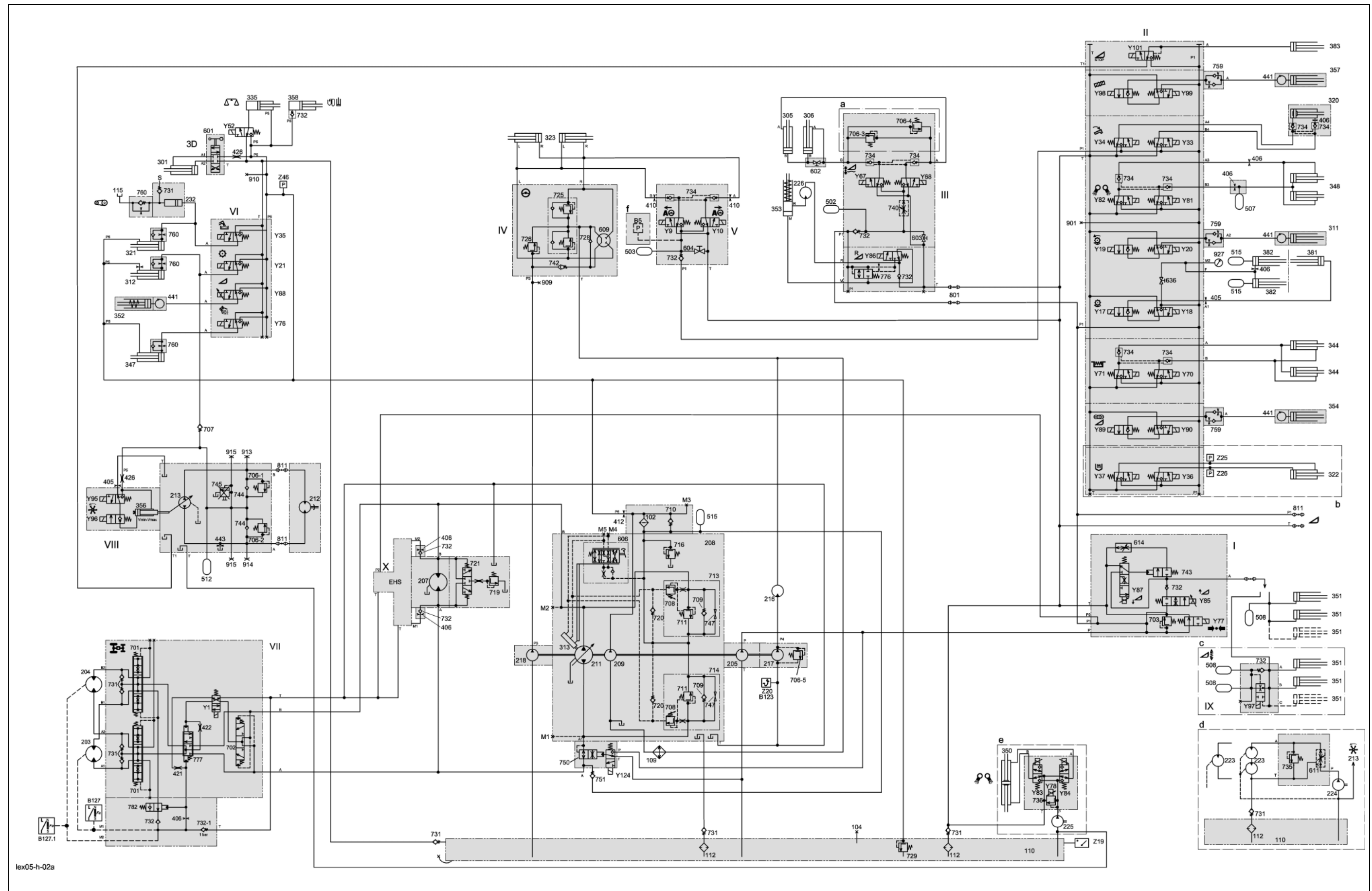


### **1.2.1**

#### **Overall Hydraulic System Circuit Diagram of Rotor Machines**

- LEXION 580 up to serial no. 586 00336

### 1.2.1 Overall Hydraulic System Circuit Diagram of Rotor Machines

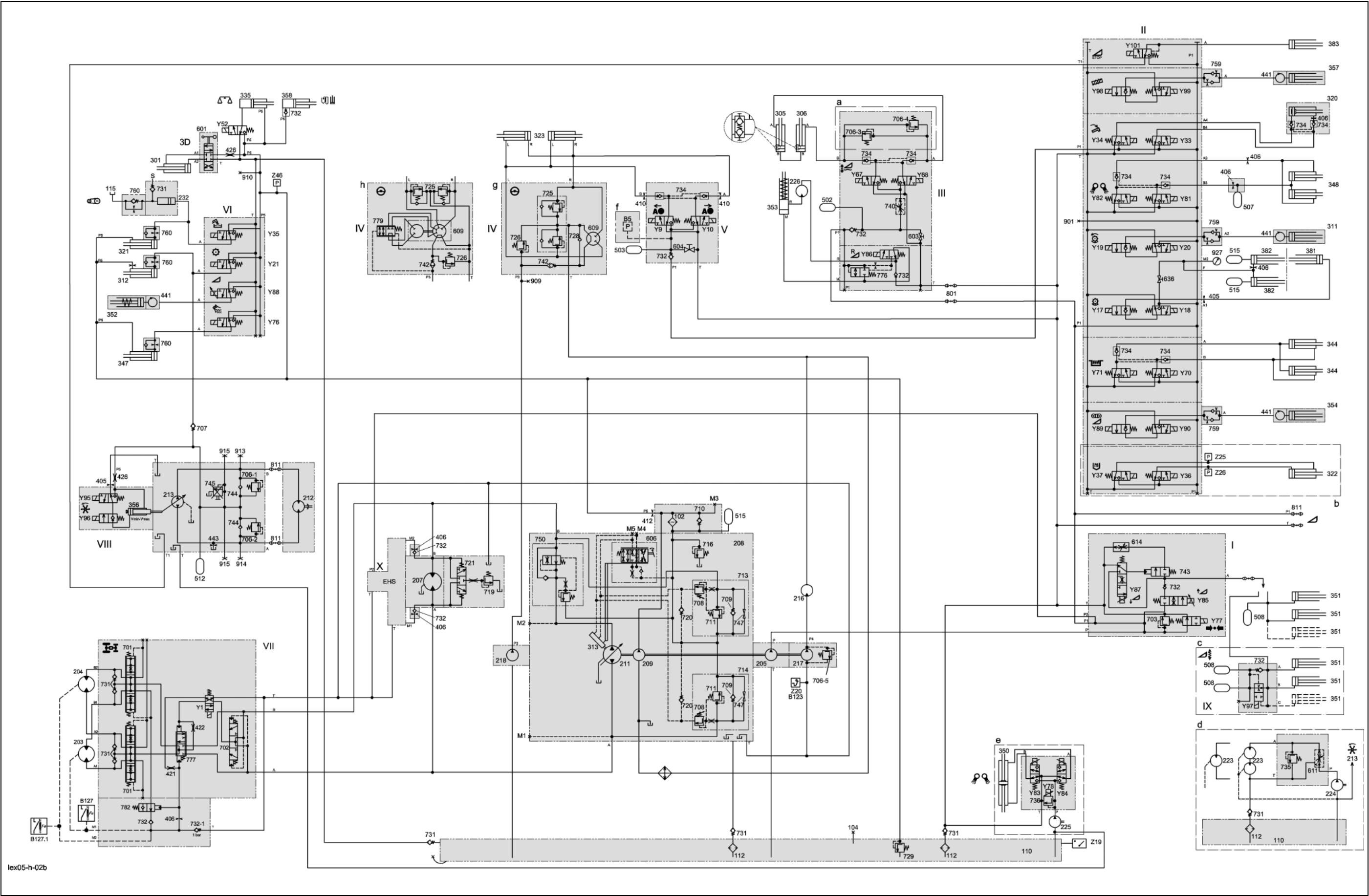


### **1.2.2**

#### **Overall Hydraulic System Circuit Diagram of Rotor Machines**

- LEXION 580 from serial no. 586 00337

1.2.2 Overall Hydraulic System Circuit Diagram of Rotor Machines  
LEXION 580 from serial no. 586 00337



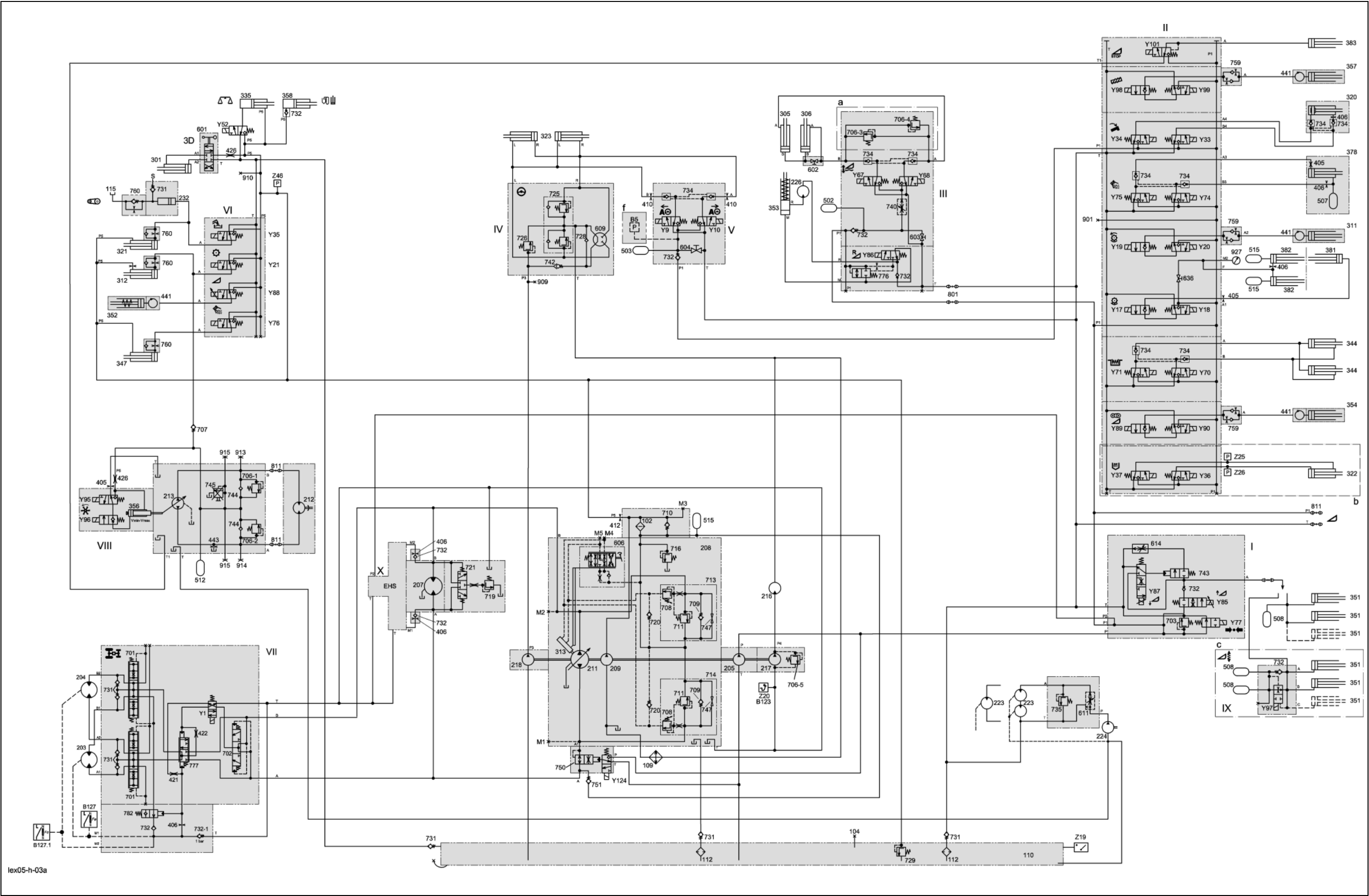
### **1.2.3**

#### **Overall Hydraulic System Circuit Diagram of Rotor Machines**

- LEXION 570 up to serial no. 585 00162

with standard straw chopper

1.2.3 Overall Hydraulic System Circuit Diagram of Rotor Machines  
LEXION 570 with standard straw chopper, up to serial no. 585 00162



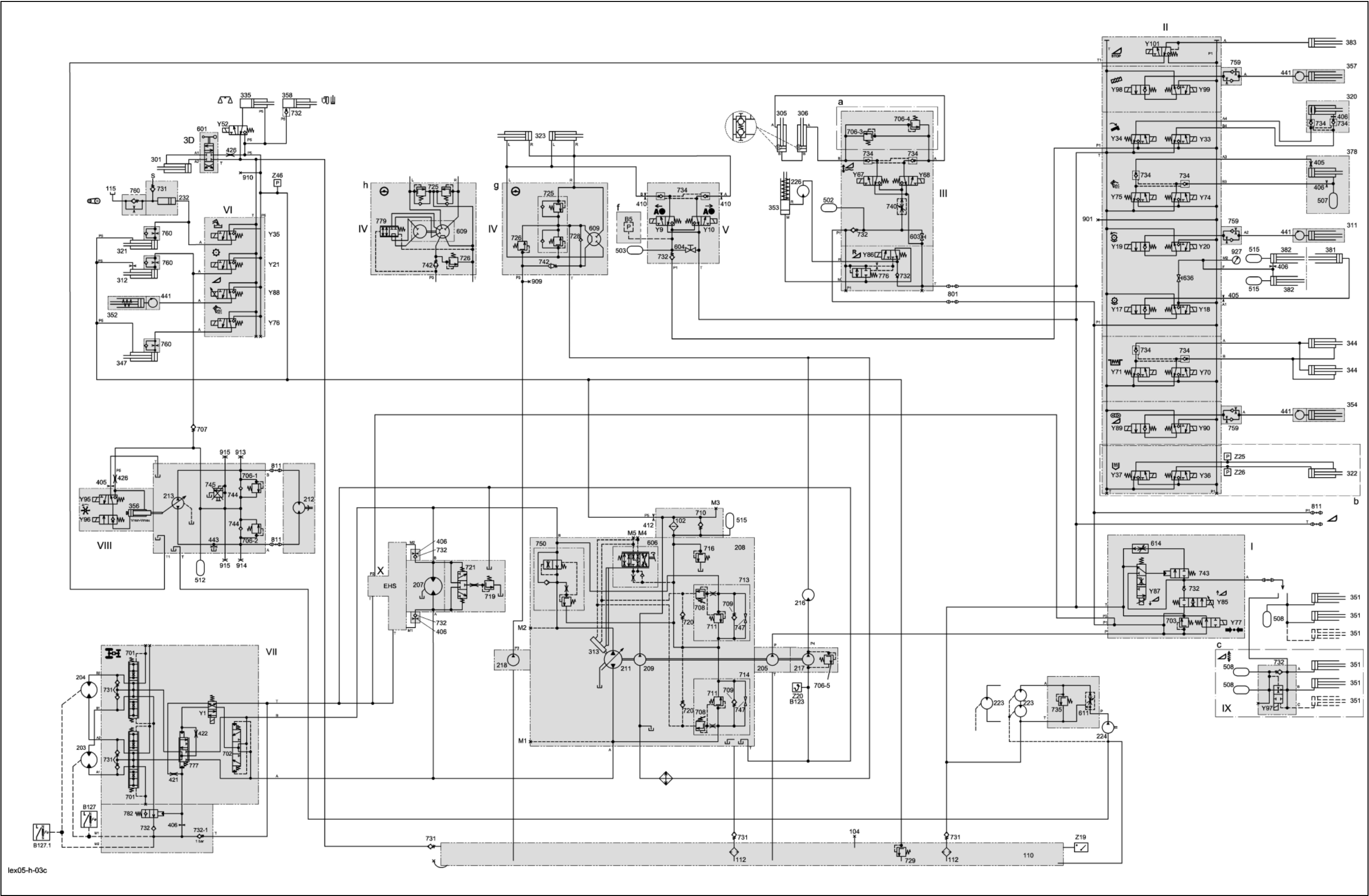
#### **1.2.4**

### **Overall Hydraulic System Circuit Diagram of Rotor Machines**

- LEXION 570 from serial no. 585 00163

with standard straw chopper

1.2.4 Overall Hydraulic System Circuit Diagram of Rotor Machines  
LEXION 570 with standard straw chopper, from serial no. 585 00163





### **1.2.5**

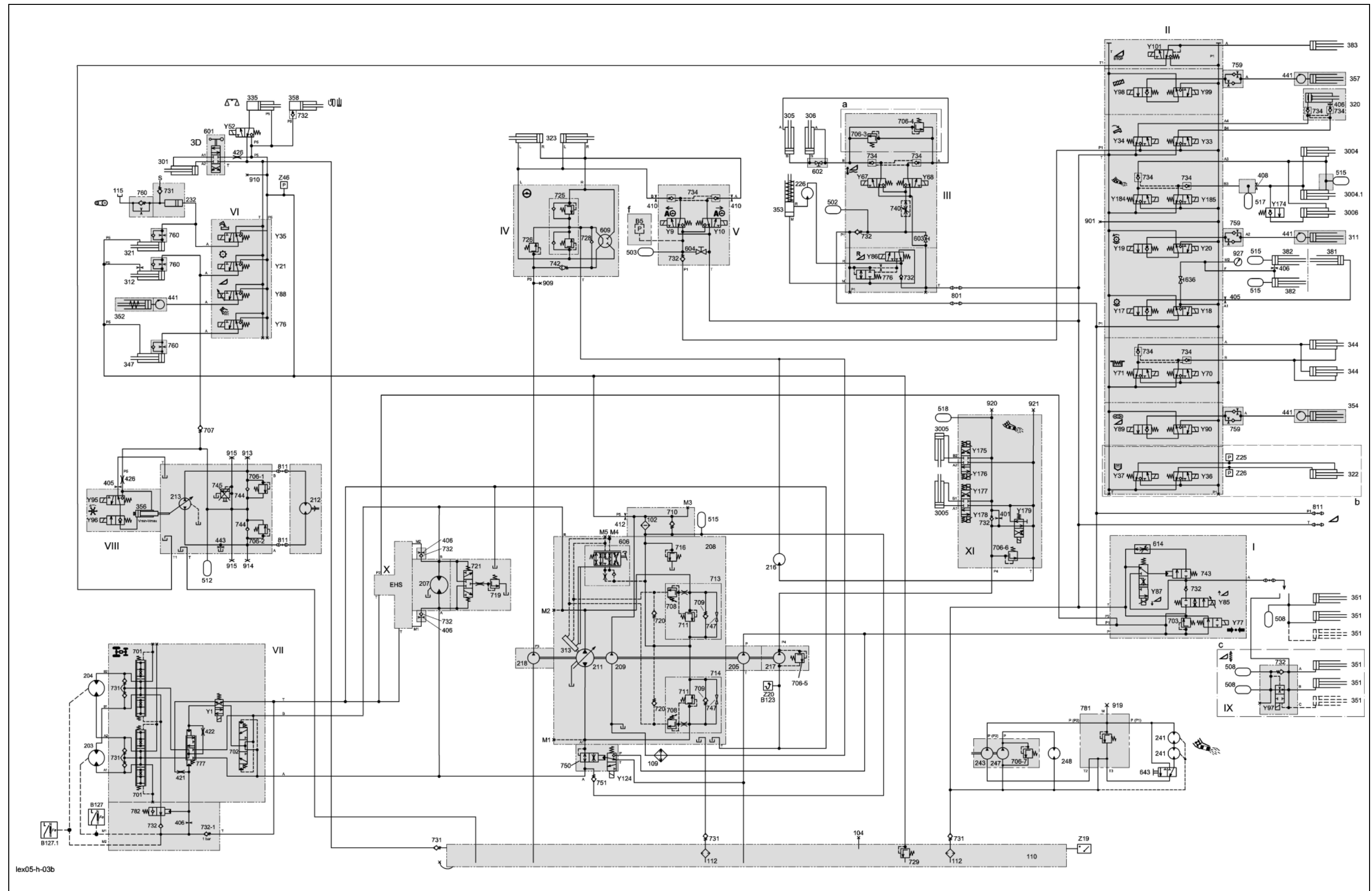
#### **Overall Hydraulic System Circuit Diagram of Rotor Machines**

- LEXION 570 up to serial no. 585 00162

with radial spreader

### 1.2.5 Overall Hydraulic System Circuit Diagram of Rotor Machines

LEXION 570 with radial spreader, up to serial no. 585 00162



### **1.2.6**

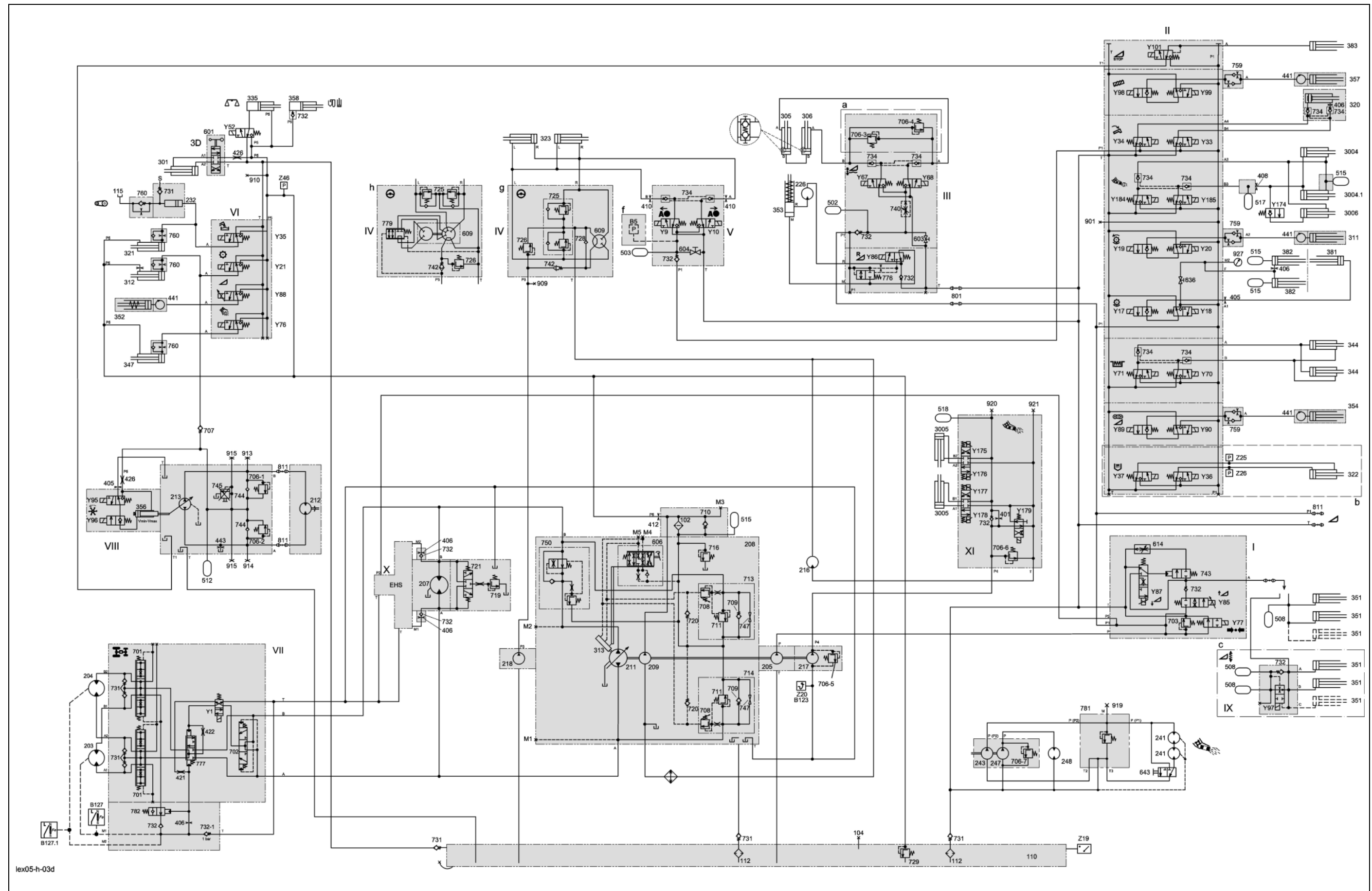
#### **Overall Hydraulic System Circuit Diagram of Rotor Machines**

- LEXION 570 from serial no. 585 00163

with radial spreader

### 1.2.6 Overall Hydraulic System Circuit Diagram of Rotor Machines

LEXION 570 with radial spreader, from serial no. 585 00163

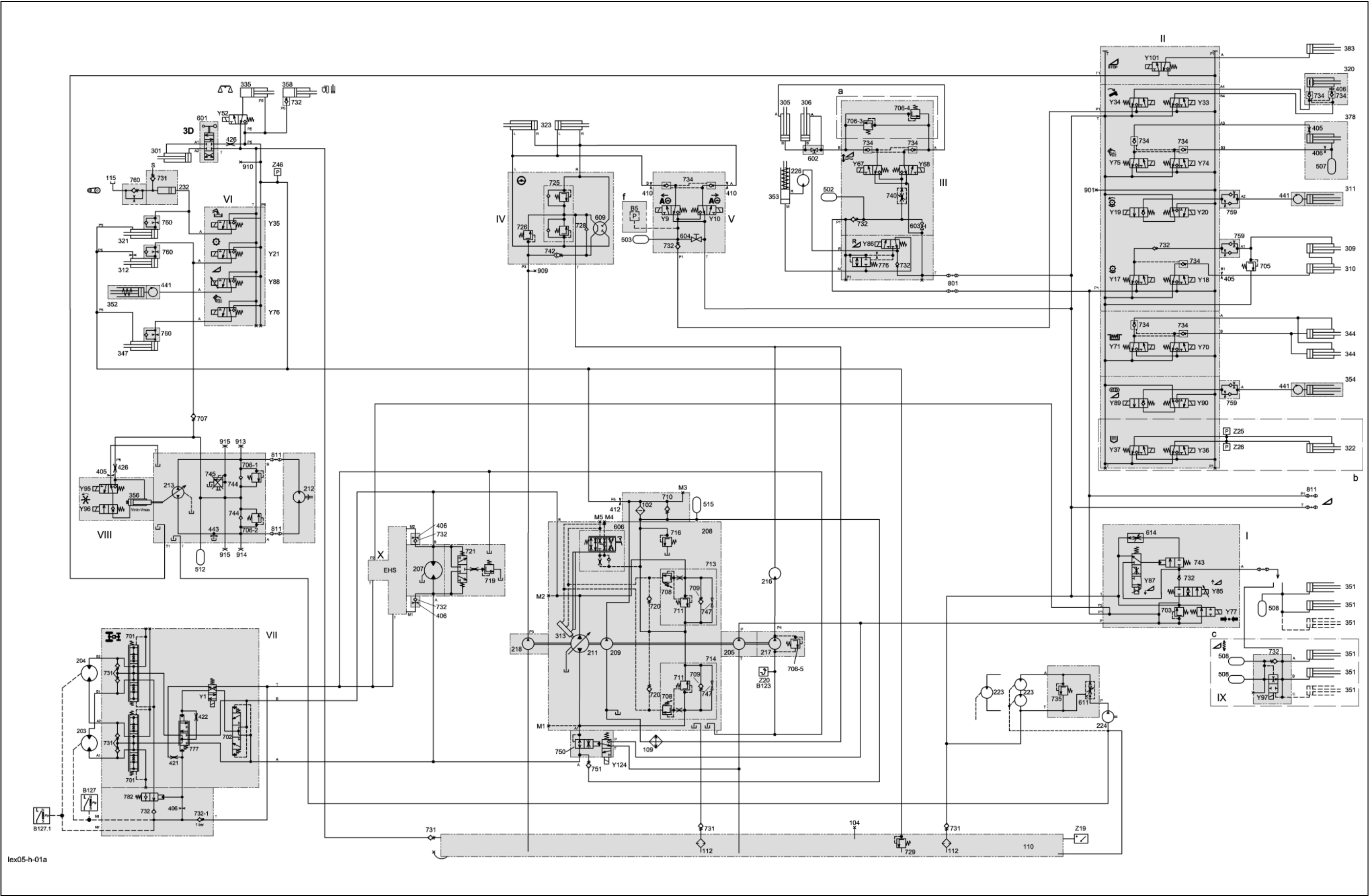


### **1.2.7**

#### **Overall Hydraulic System Circuit Diagram of Straw Walker Machines**

- LEXION 560-510 up to serial no. 584 00895  
583 00298

1.2.7 Overall Hydraulic System Circuit Diagram of Straw Walker Machines  
LEXION 560-510 up to serial no. 584 00895, 583 00298

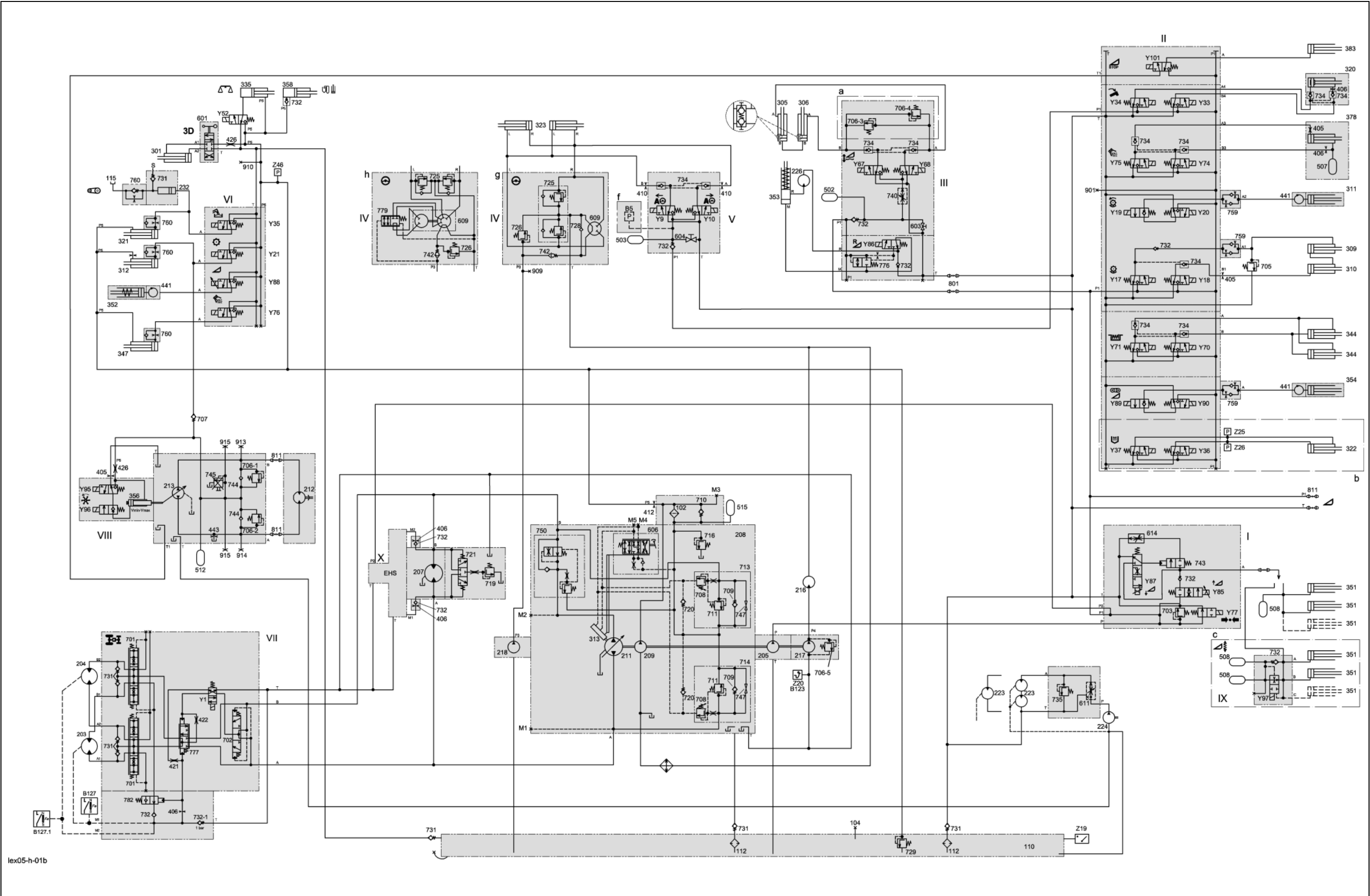


## **1.2.8**

### **Overall Hydraulic System Circuit Diagram of Straw Walker Machines**

- LEXION 560-510 from serial no. 584 00896  
583 00299

1.2.8 Overall hydraulic system circuit diagram of straw walker machines  
LEXION 500-510 from serial no. 584 00896, 583 00299





**Key to diagram:**

102	Pressure filter
104	Vent opening
109	Hydraulic system oil cooler
110	Oil tank
112	Return filter
115	Lubricant reservoir
203	4 -Trac radial piston motor, left
204	4 -Trac radial piston motor, right
205	Working hydraulics pump
207	Ground drive fixed displacement motor
208	Ground drive pump
209	Ground drive feed pump
210	Ground drive variable displacement motor
211	Ground drive variable displacement pump
212	Reel drive motor
213	Reel drive pump
216	Radiator chaff screen motor
217	Radiator chaff screen pump
218	Steering hydraulics pump
223	Chaff / straw spreader drive motor
224	Chaff / straw spreader drive pump
225	Uni-spreader drive pump
226	Front attachment reverser drive motor
231	Montana axle control system pump
232	Chain lubrication pump
241	Radial spreader disc drive motor
247	Chaff spreader pump
248	Chaff spreader motor
301	3-D sieve pan hydraulic cylinder
305	AUTOCONTOUR cross levelling right hydraulic cylinder
306	AUTOCONTOUR cross levelling left hydraulic cylinder
309	Concave adjustment left hydraulic cylinder
310	Concave adjustment right hydraulic cylinder
311	Threshing drum variable-speed drive hydraulic cylinder
312	Threshing mechanism clutch hydraulic cylinder
313	Ground drive pump servo control hydraulic cylinder

<b>Key to diagram:</b>	320	Swing grain tank unloading tube hydraulic cylinder
	321	Grain tank unloading clutch hydraulic cylinder
	322	Grain tank unloading aid hydraulic cylinder
	323	Steering hydraulic cylinder
	335	YIELD METER sample gate hydraulic cylinder
	344	Cutterbar spring lock hydraulic cylinder
	347	Straw chopper coupling hydraulic cylinder
	348	Straw chopper position hydraulic cylinder
	350	Uni-spreader hydraulic cylinder
	351	Raise/lower front attachment hydraulic cylinder
	352	Front attachment coupling hydraulic cylinder
	353	Reverse front attachment hydraulic cylinder
	354	Front attachment variable-speed drive hydraulic cylinder
	355	Ground drive servo control motor hydraulic cylinder
	356	Reel drive control variable displacement pump hydraulic cylinder
	358	Grain elevator chain tension hydraulic cylinder
	362	Differential lock hydraulic cylinder
	363	Gearbox shifting hydraulic cylinder
	364	Rotate front attachment frame hydraulic cylinder
	365	Raise/lower axle, left hydraulic cylinder
	366	Raise/lower axle, right hydraulic cylinder
	367	Cutting angle adjustment hydraulic cylinder
	378	Swathing flap hydraulic cylinder
	381	Concave adjustment hydraulic cylinder
	382	Concave overload hydraulic cylinder
	383	Front attachment quick stop hydraulic cylinder
	3003-1	Service brake / Parking brake right hydraulic cylinder
	3003-2	Service brake / Parking brake left hydraulic cylinder
	405	Orifice plate E Ø 0.6mm
	406	Orifice plate F Ø 0.8 mm
	410	Orifice plate K Ø 1.5 mm
	412	Orifice plate M Ø 2.0 mm
	421	Restrictor A
	422	Restrictor B
	426	Restrictor F 0.8mm
	441	Rotary coupling
	443	Reel drive rinsing restrictor 0.9 mm

**Key to diagram:**

502	AUTOCONTOUR / Cross levelling accumulator 0.75 l / 80 bar
503	AUTOPILOT accumulator 0.75 l / 80 bar (120 bar)
507	Straw chopper, uni-spreader position accumulator 0.075 l / 60 bar
508	Front attachment dampening accumulator 0.75 l / 80 bar
512	Reel drive accumulator 0.16 l / 80 bar
515	Accumulator
516	Service brake accumulator 0.75 l / 16 bar
601	3-D sieve pan pendulum control
602	AUTOCONTOUR / Cross levelling shut-off valve
603	AUTOCONTOUR / Cross levelling balance screw
604	AUTOPILOT balance screw
606	Ground drive servo control
609	Orbitrol steering system rotary valve
611	Chaff / straw spreader flow control valve
614	Front attachment lower flow control valve
636	Concave overload system shut-off valve
642-1	Service brake valve, right
642-2	Service brake valve, left
701	4-Trac flow control valve
702	4Trac control oil supply shuttle valve
703	Working hydraulics pressure relief valve
703	Working hydraulics pressure relief valve 180 bar
705	Concave adjustment pressure relief valve
706-1	Reel drive pressure relief valve 140 bar
706-2	Reel drive pressure relief valve 140 bar
706-3*	Cross levelling (Montana) pressure relief valve 200 bar
706-4*	Cross levelling (Montana) pressure relief valve 200 bar
706-5	Rotary chaff screen pressure relief valve 150 bar
706-6	Pressure relief valve 80 bar
706-7	Pressure relief valve
707	Pressure holding valve (non-return valve)
708	Ground drive pressure cut-off valve
709	Ground drive feed valve
710	Ground drive filter bypass valve
711	Ground drive high-pressure relief valve
713	Ground drive multi-function valve, reverse
714	Ground drive multi-function valve, forward
716	Ground drive feed pressure relief valve
719	Ground drive flush pressure control valve

<b>Key to diagram:</b>	720	Ground drive control pressure relief valve
	721	Ground drive flush-out shuttle valve
	725	Steering double shock valve
	726	Steering pressure relief valve
	728	Anti-cavitation valve (non-return valve)
	729	Low-pressure hydraulic system pressure relief valve
	731	Return line valve (non-return valve)
	732	Non-return valve
	734	Lock-up valve unit (non-return valve)
	735	Chaff and straw spreader pressure relief valve
	740	AUTOCONTOUR cross levelling flow control valve
	742	Steering safety valve
	743	Lower front attachment
	744	Reel drive feed valve
	745	Reel drive feed pressure relief valve
	747	Ground drive short-circuit valve
	749	Montana pressure relief valve 180 bar
	750	Brake restrictor valve
	751	External feed valve (non-return valve)
	759	One-way restrictor valve, two-sided
	760	One-way restrictor, one-sided
	772	Volume flow controller
	776	Reversing connecting valve
	777	4-Trac (All-wheel drive) ON/OFF
	780	Shuttle valve
	782	4-Trac quick-action stop valve
	801	Quick release coupling
	811	Front attachment multi-coupling
	901	Working hydraulics
	909	Steering hydraulics
	910	Low-pressure hydraulics
	913	Reel drive high pressure forward
	914	Reel drive high pressure backward
	915	Reel drive feed pressure
	918	Axle hydraulics measuring point
	927	Concave overload system pressure gauge

**Key to diagram:**

B90	Brake circuit charge pressure sensor
B94	Montana cutterbar cross levelling sensor
B123	Hydraulic oil temperature sensor
B127	Ground drive hydraulics metal detector sensor
Y1	4-Trac (All-wheel drive) solenoid valve
Y9	AUTOPILOT left solenoid valve
Y10	AUTOPILOT right solenoid valve
Y17	Concave narrow solenoid valve
Y18	Concave wide solenoid valve
Y19	Threshing drum variable-speed drive slow solenoid valve
Y20	Threshing drum variable-speed drive fast solenoid valve
Y21	Threshing mechanism clutch engage solenoid valve
Y33	Solenoid valve Swinging out the grain tank unloading tube
Y34	Solenoid valve Swinging in the grain tank unloading tube
Y35	Grain tank unloading solenoid valve
Y36	Grain tank unloading aid forward solenoid valve
Y37	Grain tank unloading aid backward solenoid valve
Y52	YIELD METER sample gate solenoid valve
Y67	AUTOCONTOUR cross levelling left solenoid valve
Y68	AUTOCONTOUR cross levelling right solenoid valve
Y70	Unlock cutterbar spring solenoid valve
Y71	Lock cutterbar spring solenoid valve
Y74	Straw chopper in working position solenoid valve
Y75	Straw chopper in swathing mode solenoid valve
Y76	Straw chopper coupling solenoid valve
Y77	Working hydraulics master valve solenoid valve
Y78	Uni-spreader fan master valve solenoid valve

<b>Key to diagram:</b>	Y81	Uni-spreader in working position solenoid valve
	Y82	Uni-spreader fan in transport position solenoid valve
	Y83	Swing uni-spreader to the left solenoid valve
	Y84	Swing uni-spreader to the right solenoid valve
	Y85	Raise front attachment solenoid valve
	Y86	Reverse front attachment solenoid valve
	Y87	Lower front attachment solenoid valve
	Y88	Front attachment clutch solenoid valve
	Y89	Front attachment variable-speed drive slow solenoid valve
	Y90	Front attachment variable-speed drive fast solenoid valve
	Y95	Reel speed fast solenoid valve
	Y96	Reel speed slow solenoid valve
	Y97	Front attachment dampening solenoid valve
	Y98	Rotor variable-speed drive slow solenoid valve
	Y99	Rotor variable-speed drive fast solenoid valve
	Y101	Front attachment quick stop solenoid coil
	Y105	Differential lock solenoid valve
	Y106	Parking brake solenoid valve
	Y107	Gearbox shift 1 <sup>st</sup> gear solenoid valve
	Y108	Gearbox shift 2 <sup>nd</sup> gear solenoid valve
	Y110	Raise cutting angle solenoid valve
	Y111	Lower cutting angle solenoid valve
	Y112	Rotate front attachment to the right solenoid valve
	Y113	Rotate front attachment to the left solenoid valve
	Y114	Lower axle on left-hand side solenoid valve
	Y115	Raise axle on right-hand side solenoid valve
	Y116	Lower axle on right-hand side solenoid valve
	Y117	Raise axle on right-hand side solenoid valve
	Y118	Additional oil quantity increase valve solenoid valve
	Y121	Shifting aid reverse solenoid valve
	Y122	Shifting aid forward solenoid valve
	Y124	Ground drive hydraulic motor brake restrictor (HBM) solenoid valve
	Y125	Ground drive control pressure solenoid valve
	Y128	MONTANA master valve solenoid valve
	Y144	Ground drive variable displacement motor solenoid valve
	Y184	Radial spreader swathing position solenoid valve
	Y185	Radial spreader working/transport position solenoid valve

**Key to diagram:**

Z19	Hydraulic oil level (min.)
Z20	Hydraulic oil temperature
Z25	Grain tank unloading aid forward oil pressure
Z26	Grain tank unloading aid backward oil pressure
Z46	Low-pressure hydraulics / Ground drive oil pressure
Z79	Left brake circuit pressure actual value switch
Z80	Right brake circuit pressure actual value switch
a	Valve block with integrated pressure relief valves for Montana machines, otherwise available as an option
b	Option
c	Option
d	When straw spreader is fitted
e	When uni-spreader is fitted
f	With pressure-controlled equipment
g	single-stage
h	double-stage
I	Main valve block
II	Working hydraulics valve block
III	Autocontour / Reverse valve block
IV	Steering (Orbitrol) valve block
V	Autopilot valve block
VI	Low-pressure hydraulics valve block
VIa	Low-pressure hydraulics valve block
VIb	Montana low-pressure hydraulics valve block
VII	4-Trac (All-wheel drive) valve block
VIII	Reel drive valve block
IX	Front attachment dampening valve block
X	Electro-hydraulic gearshift (EHS) valve block
XI	Axle hydraulics valve block
A	Consumer port
B	Consumer port
L	Left port
P	Pump port
P1	Pump via master valve port
P2	Working hydraulics port
P3	Steering hydraulics port
P4	Rotary chaff screen pump port
P5	Low-pressure hydraulics port
R	Right port
T	Tank port
M1	High pressure forward measuring port
M2	High pressure backward measuring port
M3	Feed pressure measuring port
M4	Actuating pressure backward measuring port
M5	Actuating pressure forward measuring port
EHS	Electro-hydraulic gearshift





## 2

### Steering Hydraulics

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## 2.1

### Steering Hydraulics Circuit Diagrams

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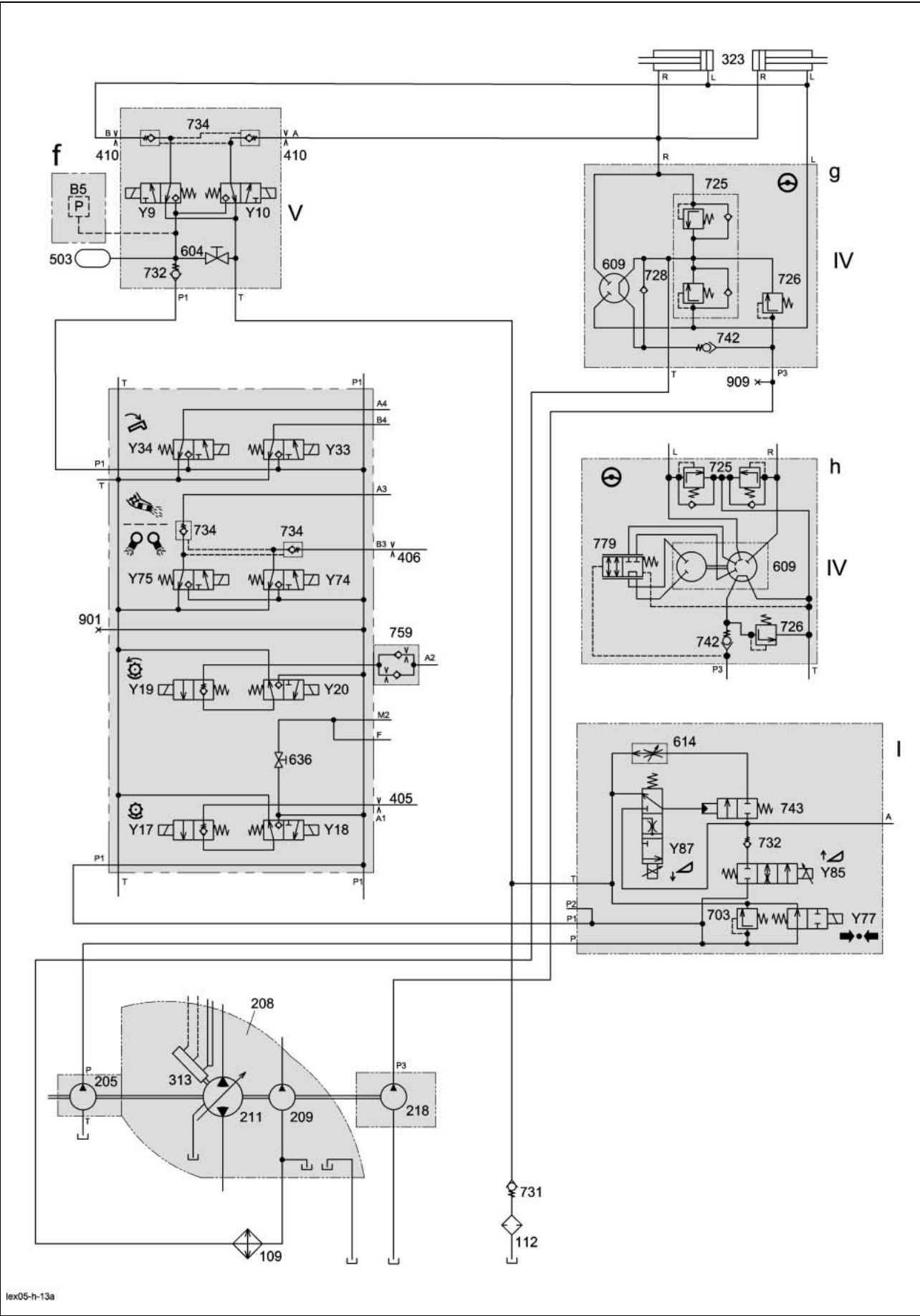
### 2.1.1

## Steering Hydraulics Circuit Diagram with AUTOPILOT

- for concave adjustment **with** filling valve



2.1.1 Steering Hydraulics Circuit Diagram with AUTOPILOT  
for concave adjustment **with** filling valve - LEXION 580 / 570



Key to diagram:

109	Oil cooler
112	Sieve filter
205	Working hydraulics pump.....14 / 19 cm <sup>3</sup> /rev.
208	Ground drive axial piston pump .....90 R 100/130
209	Ground drive feed pump .....26 cm <sup>3</sup> /rev.
211	Ground drive variable displacement pump ....100 / 130 cm <sup>3</sup> /rev.
218	Steering gear pump .....8 / 11 cm <sup>3</sup> /rev.
313	Ground drive pump servo control hydraulic cylinder
323	Steering hydraulic cylinder
405	Orifice plate E .....Ø 0.6 mm
410	Orifice plate .....Ø 1.5 mm
503	Accumulator .....0.7 l / 80 bar
604	Pressure relief bolt
609	Rotary disc valve
703	Working hydraulics pressure relief valve
725	Double shock valve .....200 <sup>+30</sup> bar
726	Pressure relief valve .....160 <sup>+15</sup> bar
728	Non-return valve (emergency steering)
731	Return line valve (non-return valve)
732	Non-return valve
734	Non-return valve (Lock-up valve unit)
742	Non-return valve (emergency steering)
743	Lower front attachment hydraulic valve
759	One-way restrictor valve, two-sided
779	Input volume changeover valve
636	Concave overload system shut-off valve
614	Front attachment lower flow control valve
901	Working hydraulics measuring point
909	Steering measuring port
I	Main valve block
IV	Steering (Orbitrol) valve block
V	AUTOPILOT valve block
B5	Oil pressure sensor (on pressure-controlled equipment).....135/160 <sup>±5</sup> bar
Y 9	AUTOPILOT left solenoid valve
Y10	AUTOPILOT right solenoid valve
Y17	Concave narrow solenoid valve
Y18	Concave wide solenoid valve
Y19	Threshing drum variable-speed drive slow solenoid valve
Y20	Threshing drum variable-speed drive fast solenoid valve
Y33	Grain tank unloading tube swing out solenoid valve
Y34	Grain tank unloading tube swing in solenoid valve
Y74	Straw chopper in working position solenoid valve
Y75	Straw chopper in swathing mode solenoid valve
Y77	Working hydraulics master valve solenoid valve
Y85	Raise front attachment solenoid valve
Y87	Lower front attachment solenoid valve

## Key to diagram:

A	Consumer port
B	Consumer port
L	Left port
P	Pump port
P1	Pump via master valve port
P2	Working hydraulics port
P3	Steering hydraulics port
P4	Rotary chaff screen pump port
P5	Low-pressure hydraulics port
R	Right port
T	Tank port
f	On pressure-controlled equipment
g	Single-stage Orbitrol
h	Double-stage Orbitrol

## Pressure measurement:

Circulation pressure	=	$10^{+7}$ bar
System pressure	=	$160^{+15}$ bar (Autopilot $180^{+15}$ bar)
Shock valve	=	$200^{+30}$ bar

**Note:** These values refer to measurements made at the max. no-load speed of the diesel engine and a hydraulic oil operating temperature of approx. 60°C.





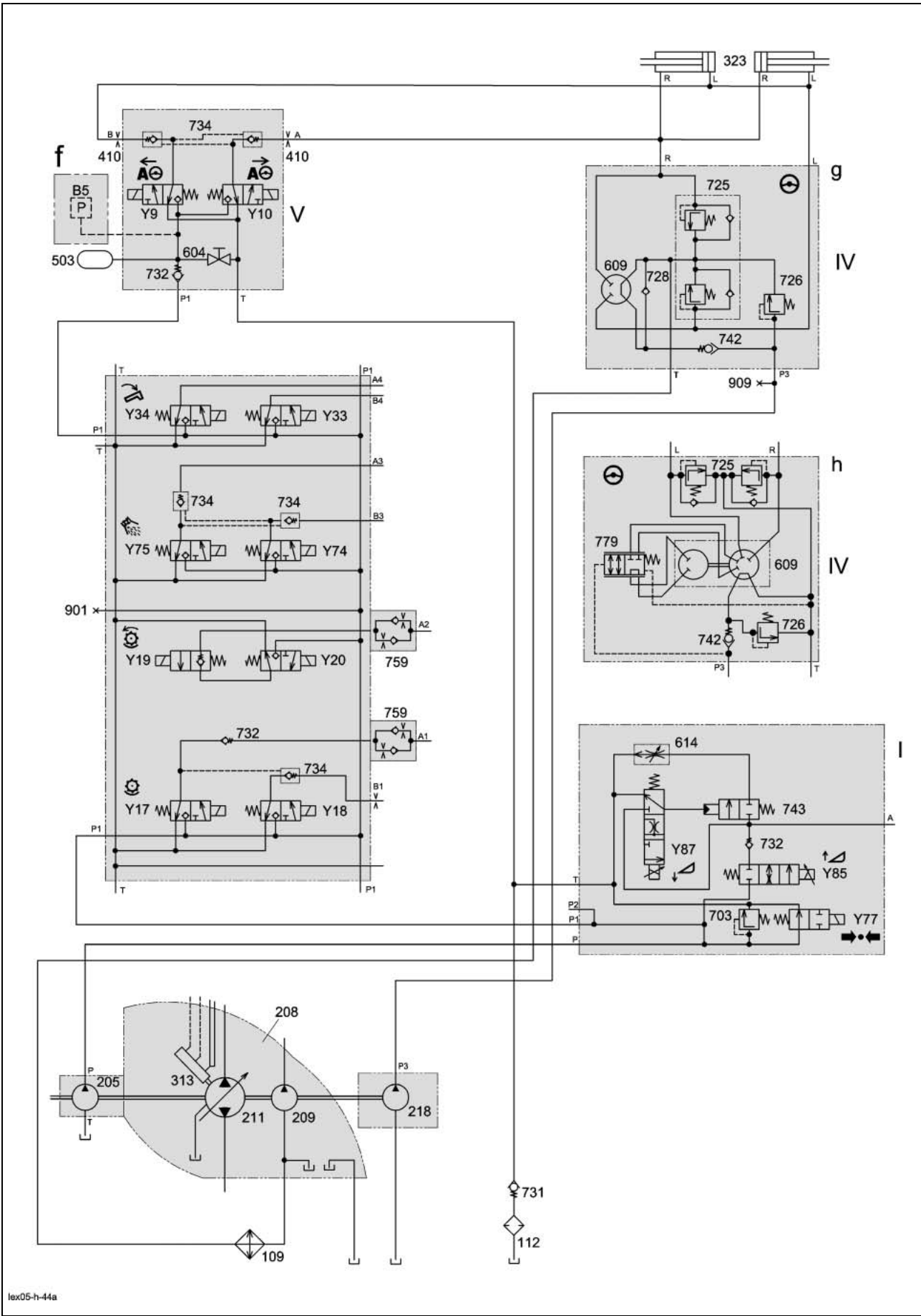
### 2.1.2

#### Steering Hydraulics Circuit Diagram with AUTOPILOT

- for concave adjustment **without** filling valve



2.1.2 Steering Hydraulics Circuit Diagram with AUTOPILOT  
for concave adjustment **without** filling valve - LEXION 560 – 510



Key to diagram:

- 109 Oil cooler
- 112 Sieve filter
- 205 Working hydraulics pump ..... 14 / 19 cm<sup>3</sup>/rev.
- 208 Ground drive axial piston pump
- 209 Ground drive feed pump..... 26 cm<sup>3</sup>/rev.
- 211 Ground drive variable displacement pump..... 100 / 130 cm<sup>3</sup>/rev.
- 218 Steering gear pump ..... 8 / 11 cm<sup>3</sup>/rev.
- 313 Ground drive pump servo control hydraulic cylinder
- 323 Steering hydraulic cylinder
- 410 Orifice plate ..... Ø 1.5 mm
- 503 Accumulator..... 0.7 l / 80 bar
- 604 Pressure relief bolt
- 609 Rotary disc valve
- 614 Front attachment lower flow control valve
- 703 Working hydraulics pressure relief valve
- 725 Double shock valve ..... 200<sup>+30</sup> bar
- 726 Pressure relief valve..... 160<sup>+15</sup> bar
- 728 Non-return valve (emergency steering)
- 731 Return line valve (non-return valve)
- 732 Non-return valve
- 734 Non-return valve (Lock-up valve unit)
- 742 Non-return valve (emergency steering)
- 759 One-way restrictor valve, two-sided
- 779 Input volume changeover valve
- 901 Working hydraulics measuring point
- 909 Steering measuring port
- I Main valve block
- IV Steering (Orbitrol) valve block
- V AUTOPILOT valve block
- B5 Oil pressure sensor  
(on pressure-controlled equipment) ..... 135/160 ±5 bar
- Y 9 AUTOPILOT left solenoid valve
- Y10 AUTOPILOT right solenoid valve
- Y19 Threshing drum variable-speed drive slow solenoid valve
- Y17 Concave narrow solenoid valve
- Y18 Concave wide solenoid valve
- Y20 Threshing drum variable-speed drive fast solenoid valve
- Y33 Grain tank unloading tube swing out solenoid valve
- Y34 Grain tank unloading tube swing in solenoid valve
- Y74 Straw chopper in working position solenoid valve
- Y75 Straw chopper in swathing mode solenoid valve
- Y77 Working hydraulics master valve solenoid valve
- Y85 Raise front attachment solenoid valve
- Y87 Lower front attachment solenoid valve

## Key to diagram:

A	Consumer port
B	Consumer port
L	Left port
P	Pump port
P1	Pump via master valve port
P2	Working hydraulics port
P3	Steering hydraulics port
P4	Rotary chaff screen pump port
P5	Low-pressure hydraulics port
R	Right port
T	Tank port
f	On pressure-controlled equipment
g	Single-stage Orbitrol
h	Double-stage Orbitrol

## Pressure measurement:

Circulation pressure	=	$10^{+7}$ bar
System pressure	=	$160^{+15}$ bar (Autopilot $180^{+15}$ bar)
Shock valve	=	$200^{+30}$ bar

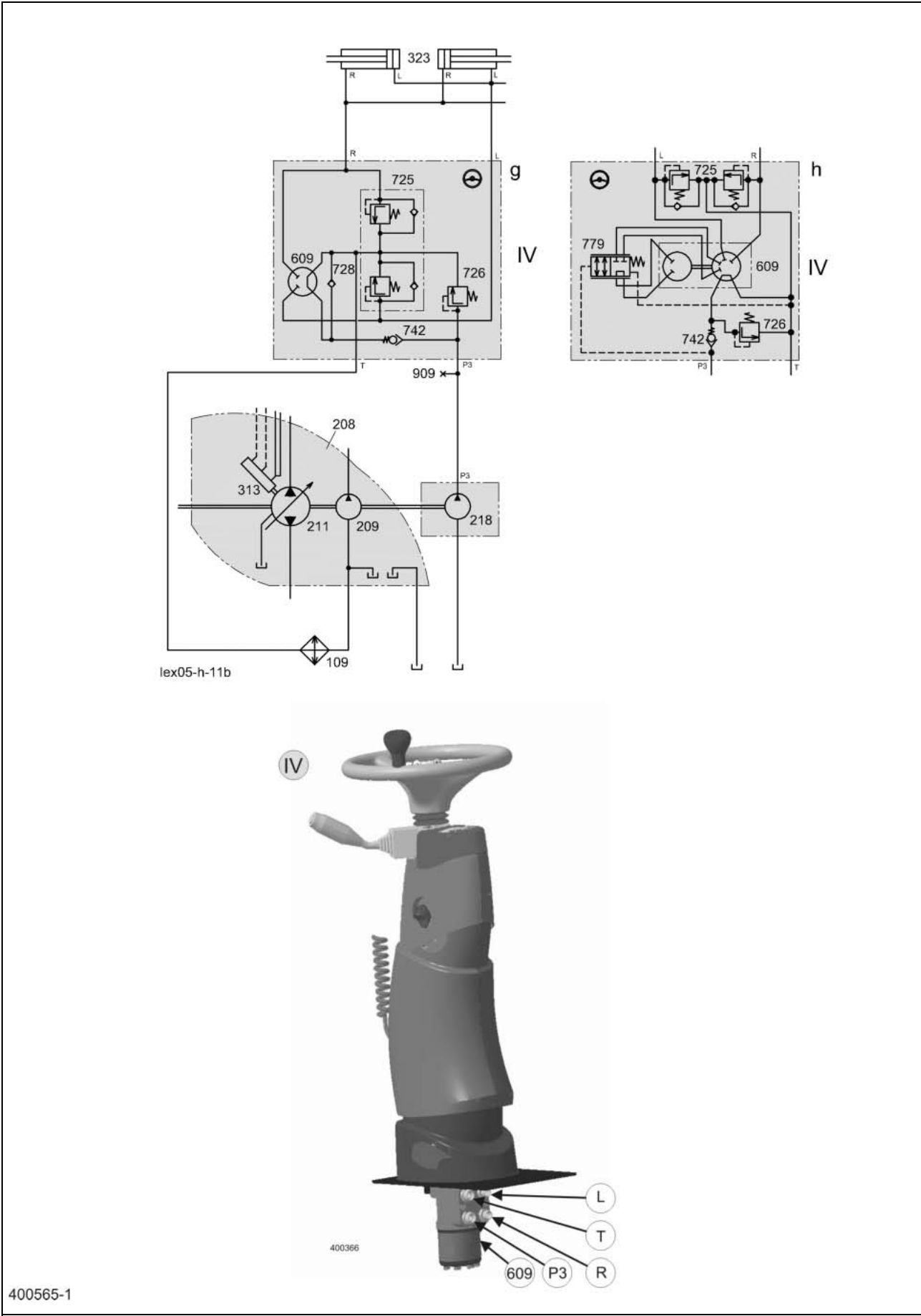
**Note:** These values refer to measurements made at the max. no-load speed of the diesel engine and a hydraulic oil operating temperature of approx. 60°C.



### **2.1.3**

#### **Steering Hydraulics Circuit Diagram without AUTOPILOT**

2.1.3 Steering Hydraulics Circuit Diagram without AUTOPILOT



Key to diagram:

109	Oil cooler
208	Ground drive axial piston pump
209	Ground drive feed pump .....26 cm³/rev.
211	Ground drive variable displacement pump .... 100 / 130 cm³/rev.
213	Reel drive pump..... 15 cm³/rev.
218	Steering gear pump .....8 / 11 cm³/rev.
323	Steering hydraulic cylinder
609	Rotary disc valve
725	Double shock valve.....200 <sup>+30</sup> bar
726	Pressure relief valve .....160 <sup>+15</sup> bar
728	Non-return valve (emergency steering)
742	Non-return valve (emergency steering)
779	Input volume changeover valve
909	Steering measuring port
IV	Steering (Orbitrol) valve block
L	Left port
P	Pump port
P3	Steering hydraulics port
R	Right port
T	Tank port
g	Single-stage Orbitrol
h	Double-stage Orbitrol

Pressure measurement:

Circulation pressure	=	10 <sup>+7</sup> bar
System pressure	=	160 <sup>+15</sup> bar
Shock valve	=	200 <sup>+30</sup> bar

**Note:** These values refer to measurements made at the max. no-load speed of the diesel engine and a hydraulic oil operating temperature of approx. 60°C.







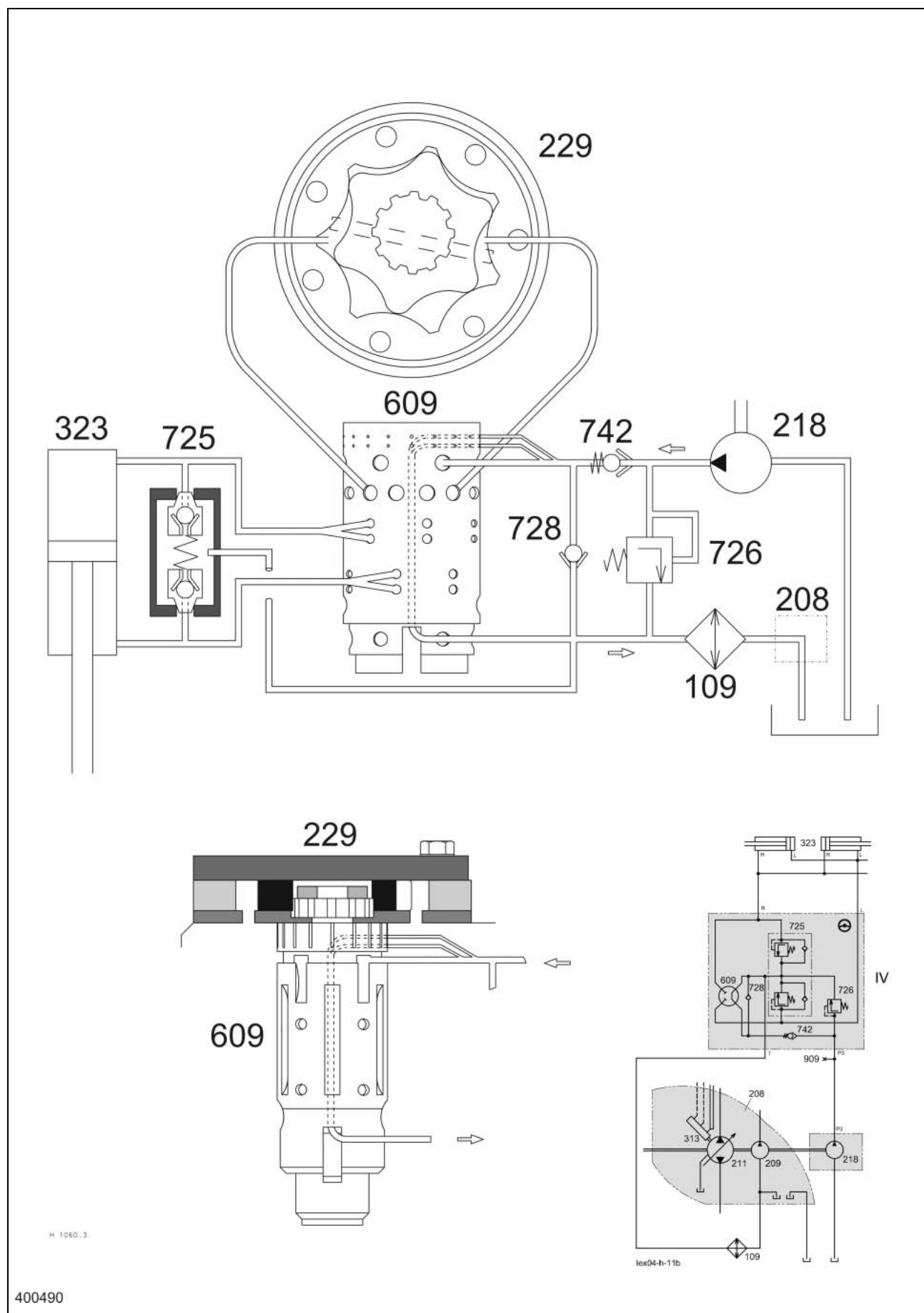
## 2.2

### Steering

<b>2.2.1</b>	<b>Function of Steering.....</b>	<b>2-18</b>
	Neutral .....	2-18
	Steering actuation.....	2-20
	Checking the steering.....	2-22
<b>2.2.2</b>	<b>Function of Steering – double-stage Orbitrol units .....</b>	<b>2-24</b>

### 2.2.1 Function of Steering

Neutral



**Key to diagram:**

109	Hydraulic system oil cooler
112	Sieve filter
208	Ground drive pump .....90R 100/130
209	Ground drive feed pump .....26 cm <sup>3</sup> /rev.
211	Ground drive variable-displacement pump
218	Steering gear pump .....8 / 11 cm <sup>3</sup> /rev.
229	Rotor (proportioning pump)
313	Ground drive pump servo control hydraulic cylinder
323	Steering hydraulic cylinder
609	Rotary disc valve
725	Double shock valve .....200 <sup>+30</sup> bar
726	Pressure relief valve .....160 <sup>+15</sup> bar
728	Non-return valve (emergency steering)
742	Non-return valve (emergency steering)
909	Steering measuring port

IV Steering (Orbitrol) valve block

**Description of function:****Steering system**

Open centre = when the steering is in neutral position, there is a connection between pump and tank.

**Valve unit**

Non reaction = when the steering is in neutral position, a force acting on the steered wheels does not cause any reaction on the steering wheel.

DANFOSS OSPC 250 with integrated valves:

O	–	Orbit (Orbitrol)
S	–	Steering
P	–	Pump
C	–	Version
250	–	Oil displacement in cm <sup>3</sup> /rev.
V	–	Valve block
20	–	Pressure setting of shock valves x10

**Design of valve unit**

The steering valve consists of a rotor (proportioning pump) (229) and a rotary disc valve (rotating distributor with inner and outer rotary disc (609).

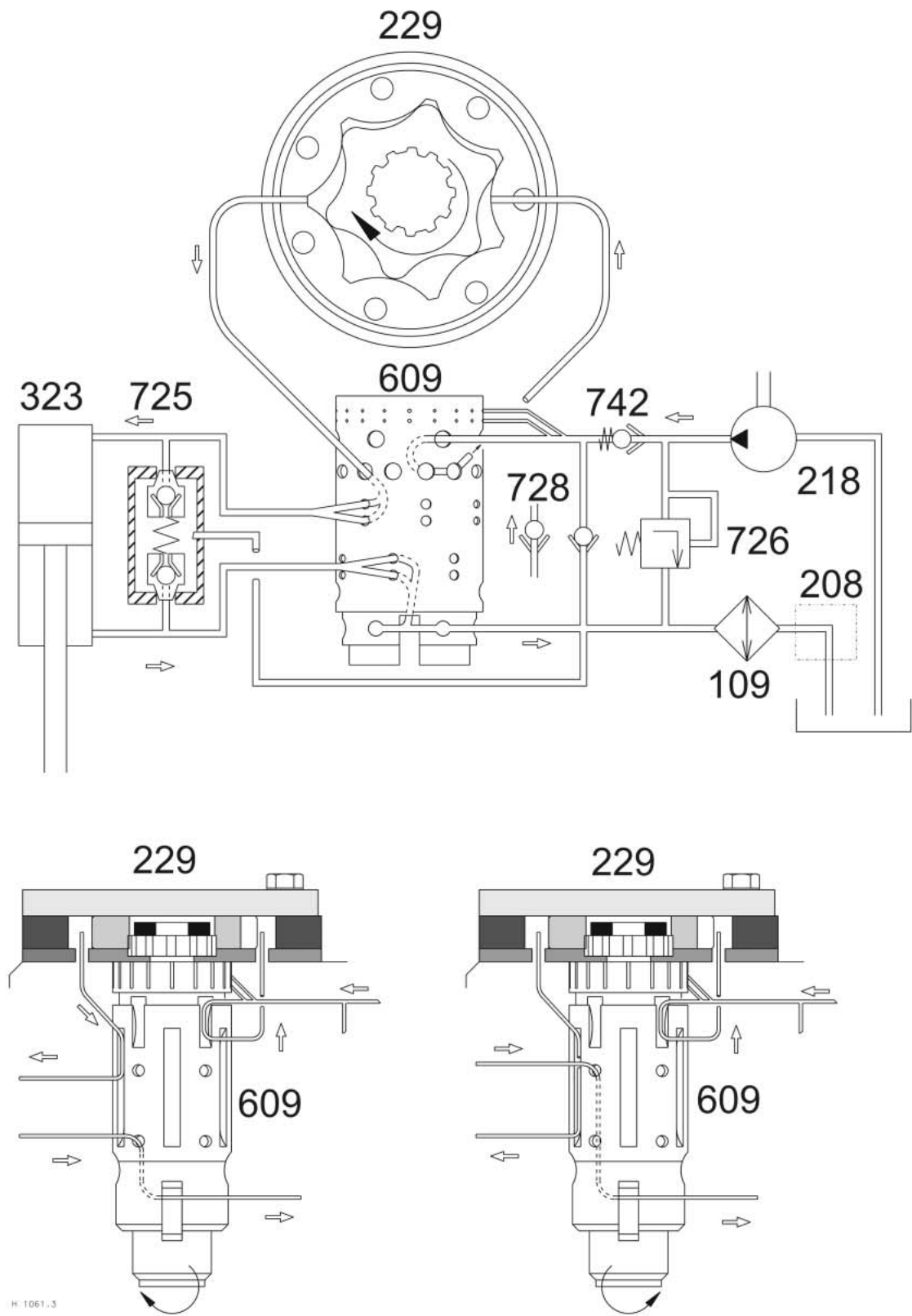
The rotary disc valve (609) is actuated by the steering gear shaft. Further steering movement of the steering wheel drives the rotor (229) via a plug-on shaft.

**Neutral function**

In neutral position, the volume flow is directed back to the tank through the non-return valve (742) and the rotary disc valve (609) (open centre). Here the circulation pressure must not exceed 20 bar (for  $n_{Eng} = \max.$  and  $t = 60^{\circ}\text{C}$ ).

Both sides of the steering cylinder (323) are shut off by the rotary disc valve (609). Pressure peaks due to external forces on the steered axle are relieved to the tank via the shock valves (725) (non reaction).

Steering actuation



400499

**Description of function:****Steering actuation function**

Via the rotor (229) and the rotary disc valve (609), the volume flow is released to the piston or the piston rod side of the steering cylinder (323) as a function of sense of rotation and rotational speed of the steering wheel. Here, the displacing surface of the steering cylinder (323) is connected with the return line to the tank via the rotary disc valve (609).

As soon as there is no more steering motion, leaf springs bring the inner and outer rotary discs (609) back to neutral position. Now both sides of the steering cylinder are shut off again and the connection from the pump (218) to the tank is re-established.

**Emergency steering function**

When the steering system is not supplied any more externally by pump (218), the non-return valve (742) closes and thus ensures that no oil will escape from the steering system.

When actuating the steering in one direction, the inner and outer rotary disc of the rotary disc valve (609) are twisted against each other correspondingly. Now the oil can be conveyed from one side of the steering cylinder (323) via non-return valve (728) to the other side through human power by driving the rotor (229).

On machines with one steering cylinder (323), a reservoir in the return line to the tank compensates the volumetric difference between the piston and piston ring surface.

When actuating the steering in one direction, the inner rotary disc (609) is twisted against the outer rotary disc (609) by up to 8°. During this process, the return line from the pump (218) to the tank is closed and the connection to the proportioning pump (229) is released.

## Checking the steering

## Steering gear shaft

Height play = 0.1 to 0.3 mm

Clearance from bottom inside rotary valve = 3 mm

## Return

When the steering wheel is actuated with the diesel engine shut off, the leaf springs in the rotary disc must bring the steering wheel back to its neutral position.

If steering reaction is insufficient, internal leaks in the steering system must be checked.

To do this, disconnect the lines from the steering cylinder and plug them tightly with plugs.

Rotational speed of steering wheel:

4 turns/minute from left stop to right stop.

This value applies when the oil has operating temperature, the diesel engine is running at max. no-load speed and for a steering force of approx. 25 Nm.

When the actual number of turns/minute is more than 4, check the steering valve for leaks.

When the actual number of turns is below 4/minute, check the steering cylinder for leaks.

## Power

In case of steering forces above 25 Nm, check tyre size and pressure, condition of the cylinder rod and if stub axles move smoothly.

A pressure test at the steering hydraulics measuring port must show the value 160<sup>+15</sup> bar.

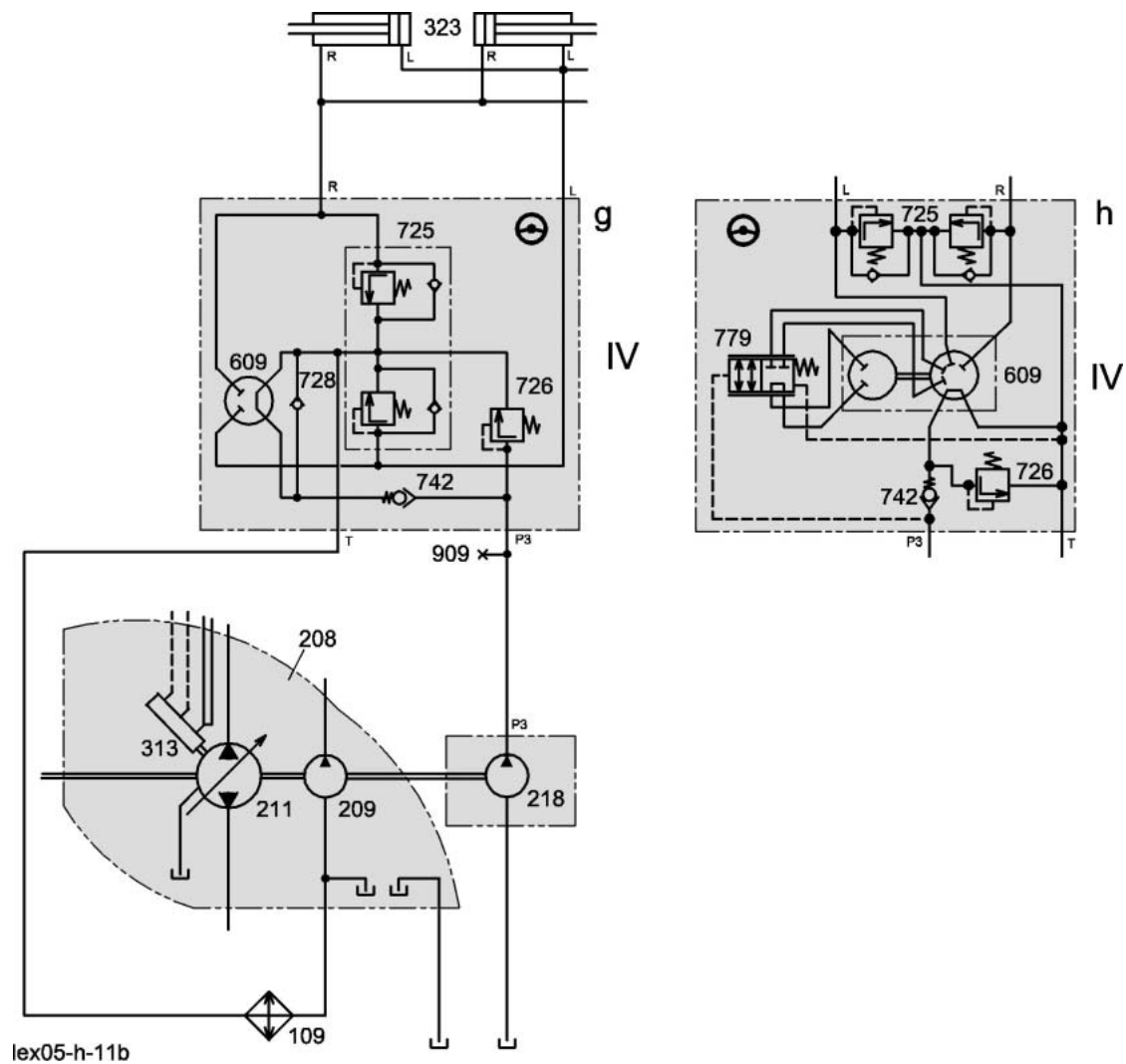
To this end move the steering wheel up to the stop and hold it in this position.

This pressure value applies to oil at operating temperature and the diesel engine running at max. no-load speed.

Adjusting the pressure relief valve on the machine in built-in condition is not possible.

**Important!** Any installation work on the steering hydraulics must be followed by venting the system on both hydraulic lines of the steering cylinder with the diesel engine running.

**Notes:**

**2.2.2 Function of Steering – double-stage Orbitrol units**



**Key to diagram:**

109	Hydraulic system oil cooler
112	Sieve filter
208	Ground drive pump .....90R 100/130
209	Ground drive feed pump .....26 cm <sup>3</sup> /rev.
211	Ground drive variable-displacement pump
218	Steering gear pump .....8 / 11 cm <sup>3</sup> /rev.
229	Rotor (proportioning pump)
313	Ground drive pump servo control hydraulic cylinder
323	Steering hydraulic cylinder
609	Rotary disc valve
725	Double shock valve .....200 <sup>+30</sup> bar
726	Pressure relief valve .....160 <sup>+15</sup> bar
728	Non-return valve (emergency steering)
742	Non-return valve (emergency steering)
779	Input volume changeover valve
909	Steering measuring port
IV	Steering (Orbitrol) valve block
g-	Single-stage Orbitrol
h-	Double-stage Orbitrol

**Description of function:**

In double-stage Orbitrol units, a steering unit with a bigger proportioning pump and an additional emergency steering pump is used. During normal operation, both pumps work in parallel.

Thus a sufficient oil volume is made available in case of increased oil requirements (larger hydraulic cylinders) from both pumps.

In emergency operation, the smaller pump ensures the necessary force transmission when the number of steering wheel turns increases.

When the steering hydraulics pump does not pump any oil, the input volume changeover valve (779) is in the position as shown. Thus only the emergency steering rotor set (1) is active.

When the steering hydraulics pump builds up the pressure as the oil flow is sufficient (circulation pressure approx. 3 bar), the input volume changeover valve (779) activates the second rotor set (2) in parallel.

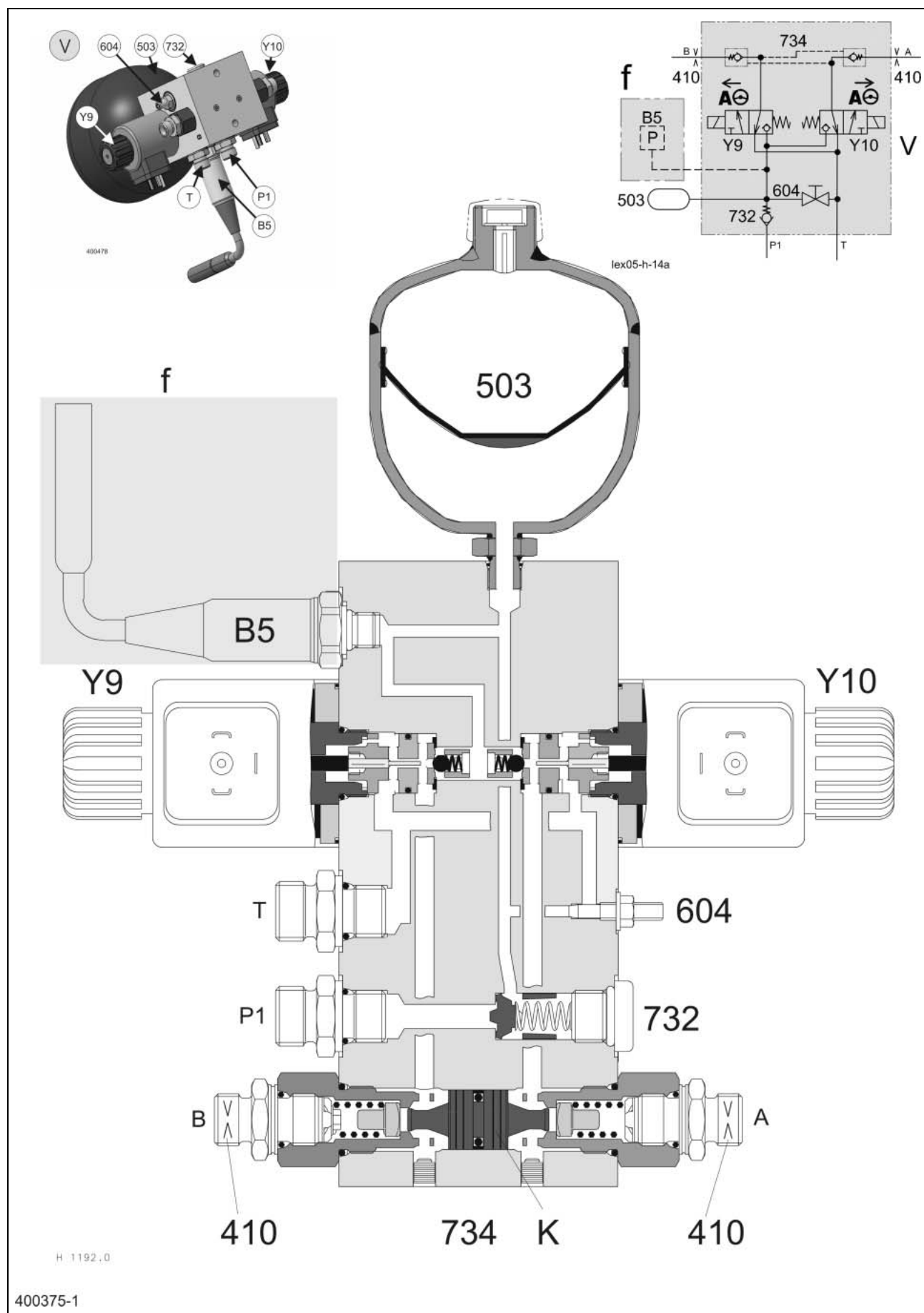
**Notes:**

2.3

AUTOPILOT

2.3.1	<b>AUTOPILOT Right/Left Function.....</b>	<b>2-28</b>
	4/3 way solenoid valve .....	2-28
	Hydraulic cylinder with integrated sensor.....	2-32
	Checking the AUTOPILOT system.....	2-33

### 2.3.1 AUTOPILOT Right/Left Function 4/3 way solenoid valve



**Key to diagram:**

410	Orifice plate K.....	Ø 1.5 mm
503	Accumulator .....	0.7 l / 80 bar
604	Pressure relief bolt	
732	Non-return valve (inlet valve)	
734	Non-return valve (Lock-up valve unit)	
B5	Oil pressure sensor (on pressure-controlled equipment) .....	135/160 <sup>±5</sup> bar
Y 9	AUTOPILOT left solenoid valve	
Y10	AUTOPILOT right solenoid valve	
T	Working hydraulics return line port	
P1	Working hydraulics pump via circulation shut-off valve port	
A	Steering cylinder port	
B	Steering cylinder port	
K	Piston	
V	AUTOPILOT valve block	
f	On pressure-controlled equipment	

**Important!** When dismantling items 503, 732, B5, Y9 or Y10, the accumulator must be relieved at the pressure relief bolt (604).

**Measured value table:**

Item	Component	Measured value	Remark
B5	Sensor	0.25 – 4.75 V at 0 - 250 bar	linear (135 bar ≈ 2.5 V 160 bar ≈ 3.0 V)

**Description of function:**

Loading the accumulator  
(503)

**pressure-controlled (with  
B5)**

When the signal voltage at the oil pressure sensor (B5) is below 2.5 Volt (accumulator pressure below 135±5 bar), the Autopilot module (A9) actuates the master valve (Y77). The pressure build-up within the system caused by the circulation shut-off valve pre-loads the accumulator (503) via the non-return valve (732).

When the system pressure and therefore the accumulator pressure reaches 160±5 bar (signal voltage at oil pressure sensor B5 above 3.0 Volt), the Autopilot module (A9) cuts the power supply to the master valve (Y77). The valve unit goes back to neutral position. The non-return valve (732) separates the energy thus stored from the remaining working hydraulics system.

**time-controlled  
(without B5)**

The accumulator is filled cyclically. The steering cylinder path is considered in this process.

After activating the Autopilot function, the AUTOPILOT module (A9) actuates the master valve (Y77) for 0.7 sec. The accumulator pressure thus corresponds to the working hydraulics system pressure.

The path covered by the steering cylinder as a function of steering movements is added up in the AUTOPILOT module (A9). After a path corresponding roughly to a drop of accumulator pressure to 150 bar, the AUTOPILOT module (A9) again actuates the master valve (Y77) automatically for 0.7 sec.

The pressure in this closed AUTOPILOT system is applied at the balls in the valve inserts of solenoid valves (Y9/Y10).

Steering movement

One of the solenoid valves (Y9/Y10) is actuated by the Autopilot module, depending on the required steering direction.

The corresponding pilot spool opens the ball in the valve insert against the applied accumulator pressure and closes the return line to the tank. The rising pressure builds up against the piston of lock-up valve unit (734) and in this process opens the non-return valve at port A or B.

The piston (K) opens the non-return valve in the opposite port. This opens the connection from the steering cylinder to the tank, via the unactuated solenoid valve. The steering cylinder now retracts or extends.

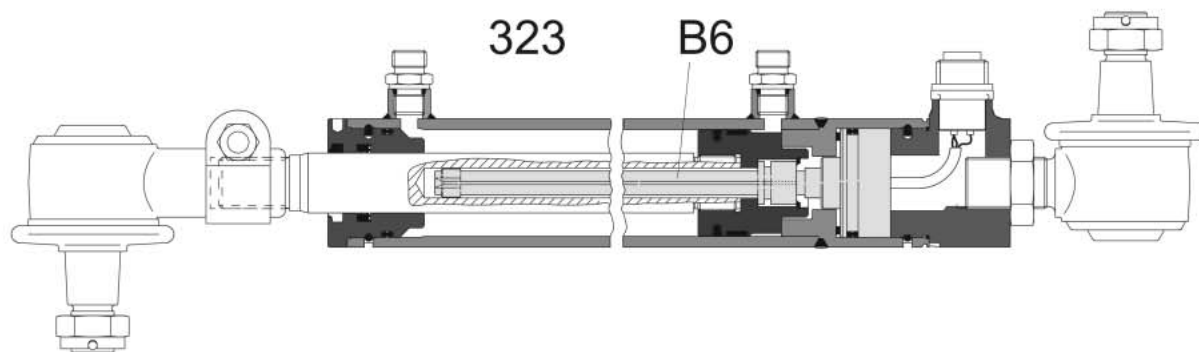
When the corresponding steering angle has been reached, the Autopilot module deenergizes the solenoid valve (Y9/Y10).

If the oil pressure in the accumulator (503) falls below 135±5 bar during the steering process (signal voltage at the oil pressure sensor B5 below 2.5 Volt), the Autopilot module (A9) actuates the master valve (Y77) again and the accumulator (503) is pre-loaded again.

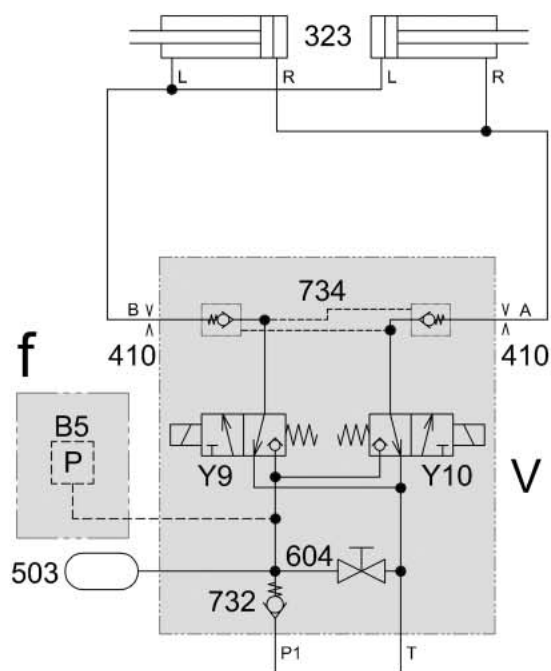
**Notes:**

**AUTOPILOT Right/Left Function**

Hydraulic cylinder with integrated sensor



H 1205.0



lex05-h-47a



**Key to diagram:**

B6	Autopilot sensor
323	Steering hydraulic cylinder
410	Orifice plate K.....Ø 1.5 mm
503	Accumulator .....0.7 l / 80 bar
604	Pressure relief bolt
732	Non-return valve (inlet valve)
734	Lock-up valve unit (non-return valve)
A	Consumer port
B	Consumer port
B5	Oil pressure sensor (on pressure-controlled equipment) .....135/160 <sup>±5</sup> bar
Y9	AUTOPILOT left solenoid valve
Y10	AUTOPILOT right solenoid valve
V	AUTOPILOT valve block

## Checking the AUTOPILOT system

**Note:** When checking the steering at standstill, relieve the load from the rear axle by raising the machine.

## Fault

With the AUTOPILOT activated, the rear axle does not react. Manual steering and working hydraulics work flawlessly.

## Diagnosis

When the steering reacts when the corresponding solenoid valve is actuated manually, troubleshooting should start in the electric system.

When the steering reacts to manual actuation only if another working hydraulics function is also actuated, check the "Charge accumulator" function (see the relevant chapter).

## Fault

The hydraulic system is overheated in AUTOPILOT operation.

## Diagnosis

If overheating is removed by disconnecting the oil pressure switch connector, the following causes are possible:

Accumulator (503) defective  
Oil pressure switch (B5) defective  
Valve insert in solenoid valves (Y9 and Y10) leaky  
Inlet valve (732) leaky  
Pressure relief bolt (604) leaky

## Fault

With the AUTOPILOT shut off, manual steering is heavy on one side.

## Diagnosis

Check the corresponding non-return valve in the lock-up valve unit (734).

## Fault

The machines automatically steers to one or another direction.

## Diagnosis

Check the corresponding non-return valve in the lock-up valve unit (734) and/or the steering cylinder seals.



**3****Working  
Hydraulics**

<b>3.1</b>	<b>Working Hydraulics Circuit Diagram.....</b>	<b>3-3</b>
<b>3.2</b>	<b>Main Valve .....</b>	<b>3-31</b>
<b>3.3</b>	<b>Concave Adjustment.....</b>	<b>3-41</b>
<b>3.4</b>	<b>Threshing Drum Speed Control .....</b>	<b>3-53</b>
<b>3.5</b>	<b>Uni-spreader / Radial spreader / Swing Swathing Flap.....</b>	<b>3-59</b>
<b>3.6</b>	<b>Swing Grain Tank Unloading Tube.....</b>	<b>3-73</b>
<b>3.7</b>	<b>Rotor Speed Control .....</b>	<b>3-79</b>
<b>3.8</b>	<b>Front Attachment Quick Stop.....</b>	<b>3-85</b>
<b>3.9</b>	<b>Cutterbar Spring Lock.....</b>	<b>3-91</b>
<b>3.10</b>	<b>Feed Rake Conveyor / Front Attachment Speed Controller.....</b>	<b>3-97</b>
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## 3.1

### Working Hydraulics Circuit Diagram

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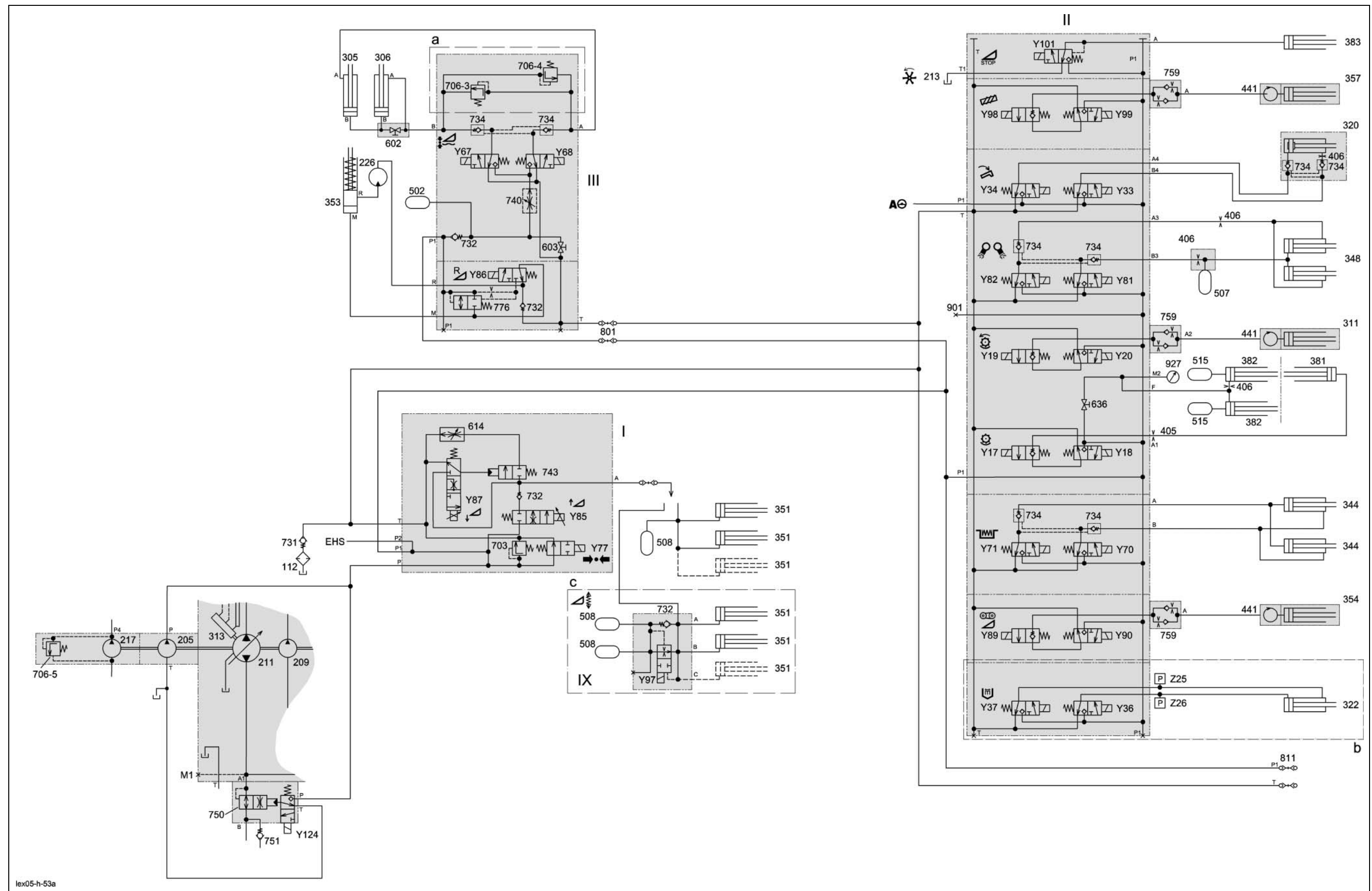
### **3.1.1**

#### **Working Hydraulics Circuit Diagram of Rotor Machines**

- LEXION 580 up to serial no. 586 00336

### 3.1.1 Working Hydraulics Circuit Diagram of Rotor Machines

LEXION 580 up to serial no. 586 00336



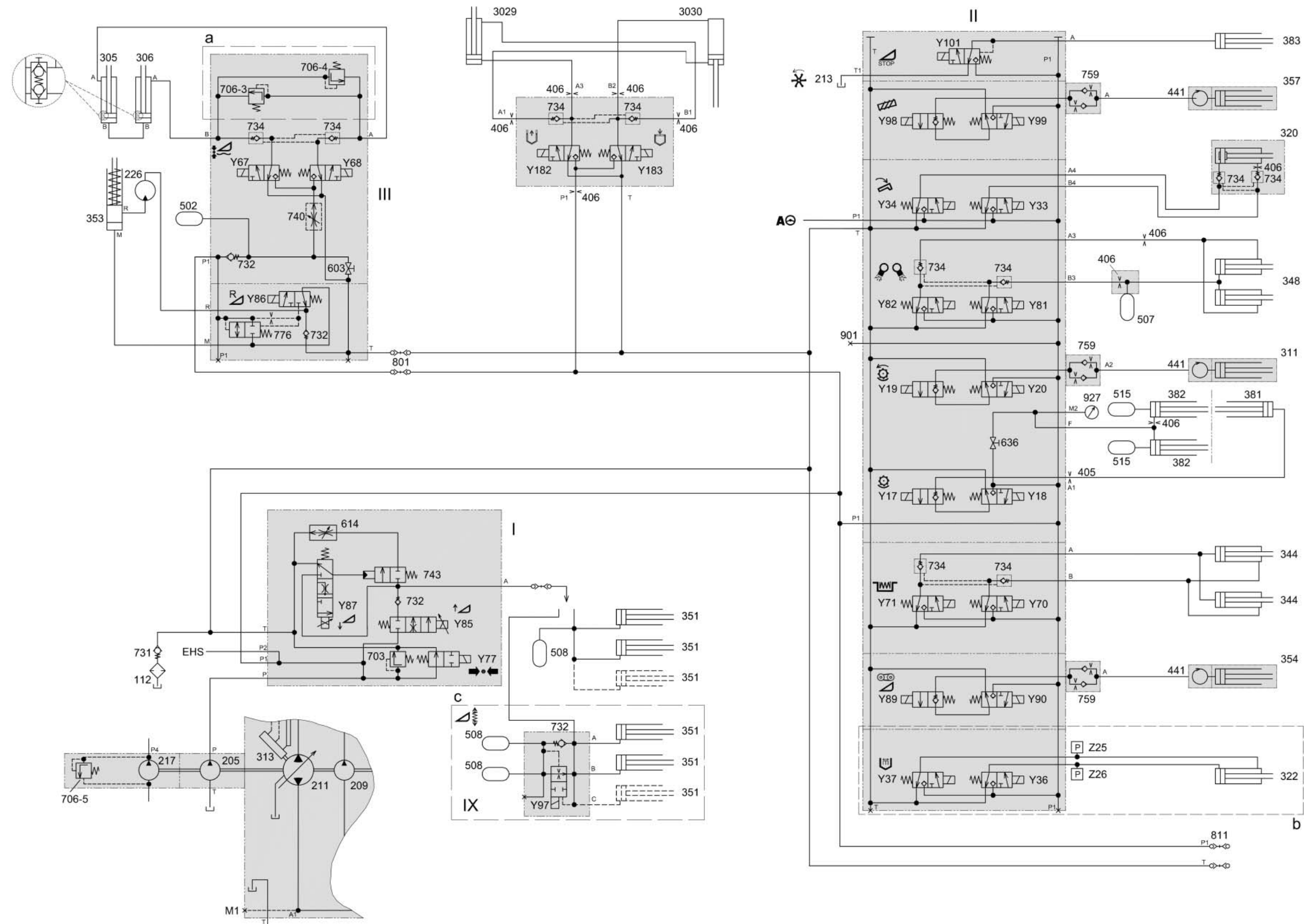


### **3.1.2**

#### **Working Hydraulics Circuit Diagram of Rotor Machines**

- LEXION 580 from serial no. 586 00337

### 3.1.2 Working Hydraulics Circuit Diagram of Rotor Machines



lex05-h-53b

### **3.1.3**

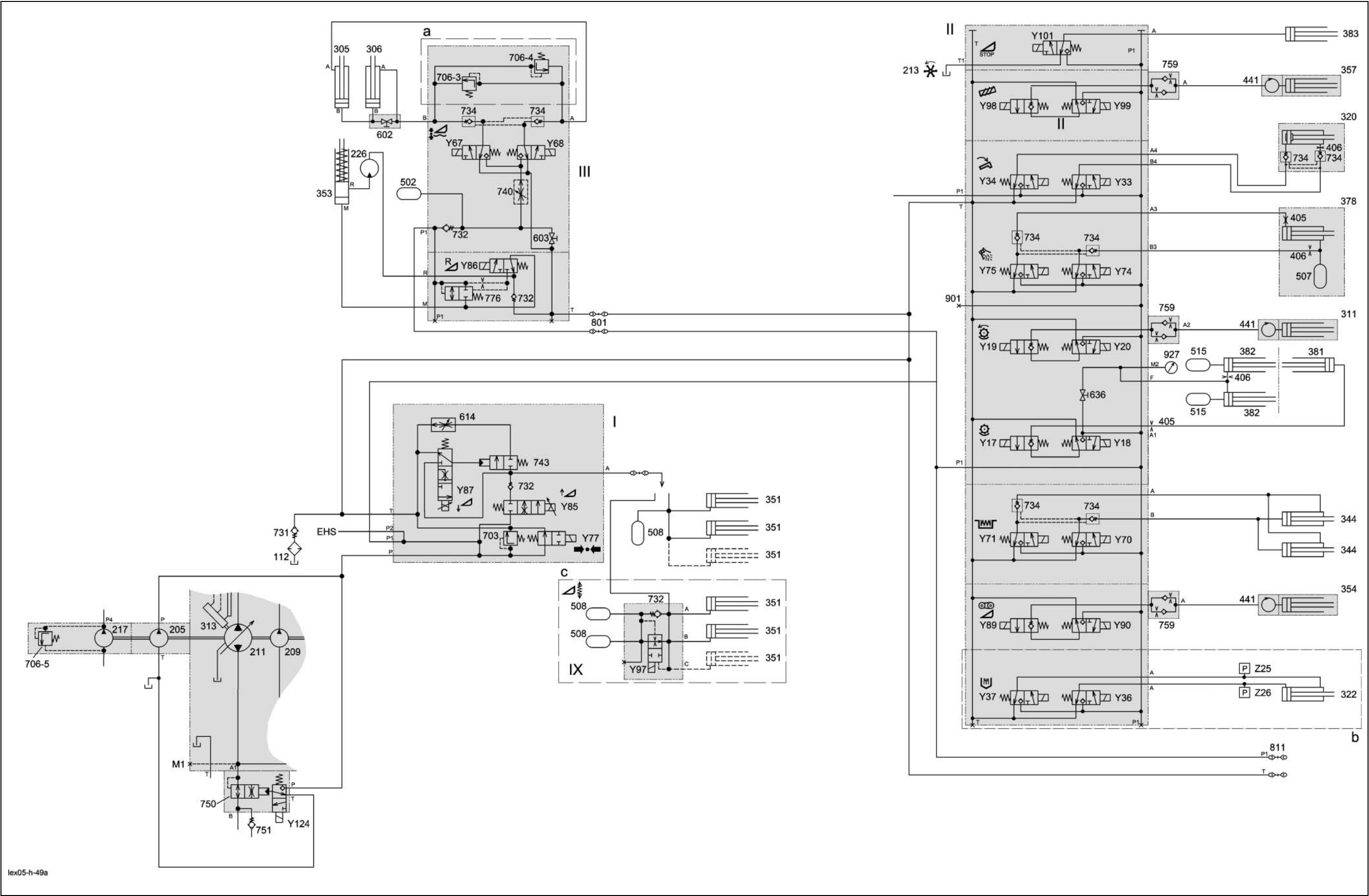
#### **Working Hydraulics Circuit Diagram of Rotor Machines**

- LEXION 570 up to serial no. 585 00162

with standard straw chopper

3.1.3 Working Hydraulics Circuit Diagram of Rotor Machines

LEXION 570 with standard straw chopper, up to serial no. 585 00162



### **3.1.4**

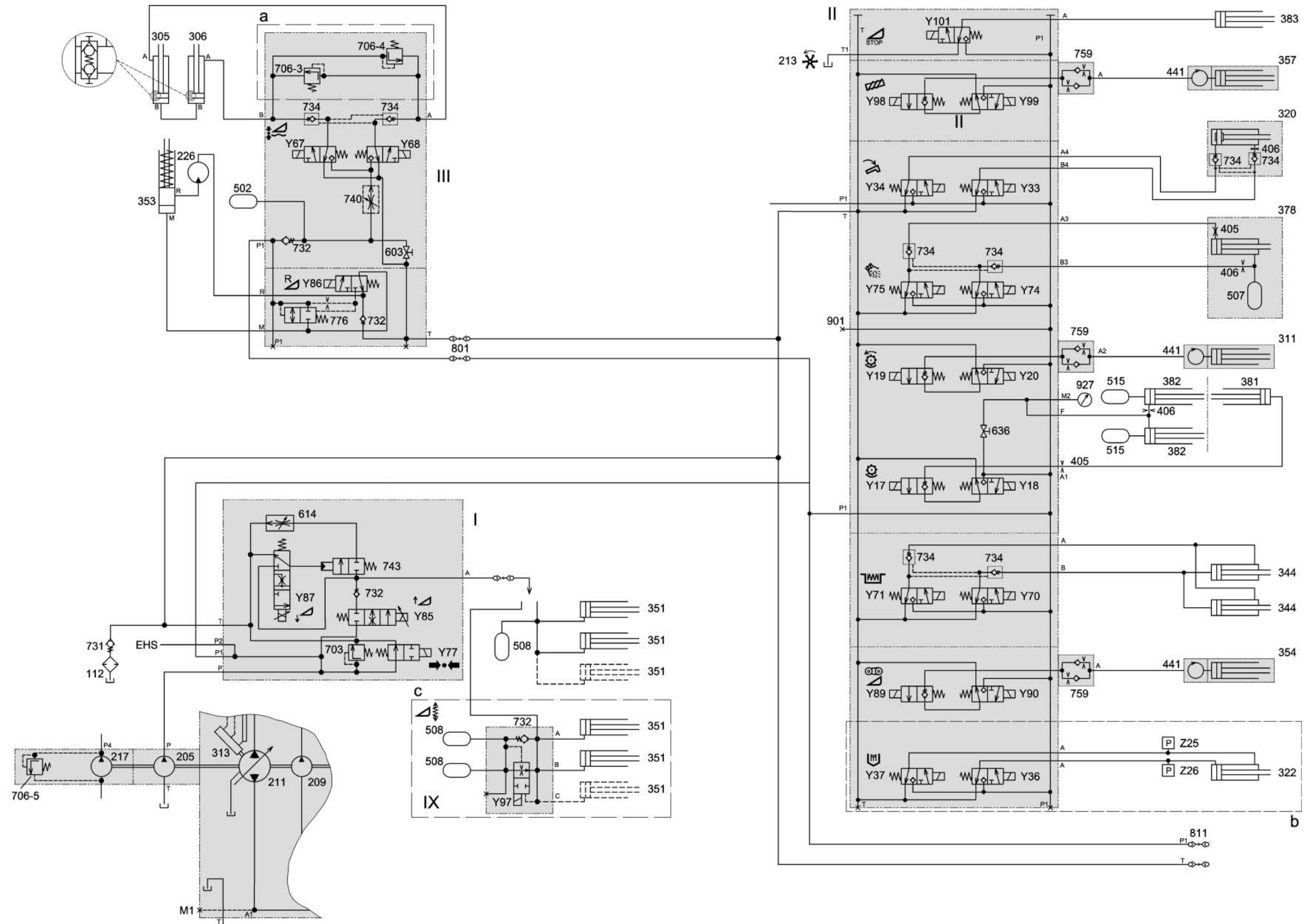
#### **Working Hydraulics Circuit Diagram of Rotor Machines**

- LEXION 570 from serial no. 585 00163

with standard straw chopper

### 3.1.4 Working Hydraulics Circuit Diagram of Rotor Machines

LEXION 570 with standard straw chopper, from serial no. 585 00163



lex05-h-49b

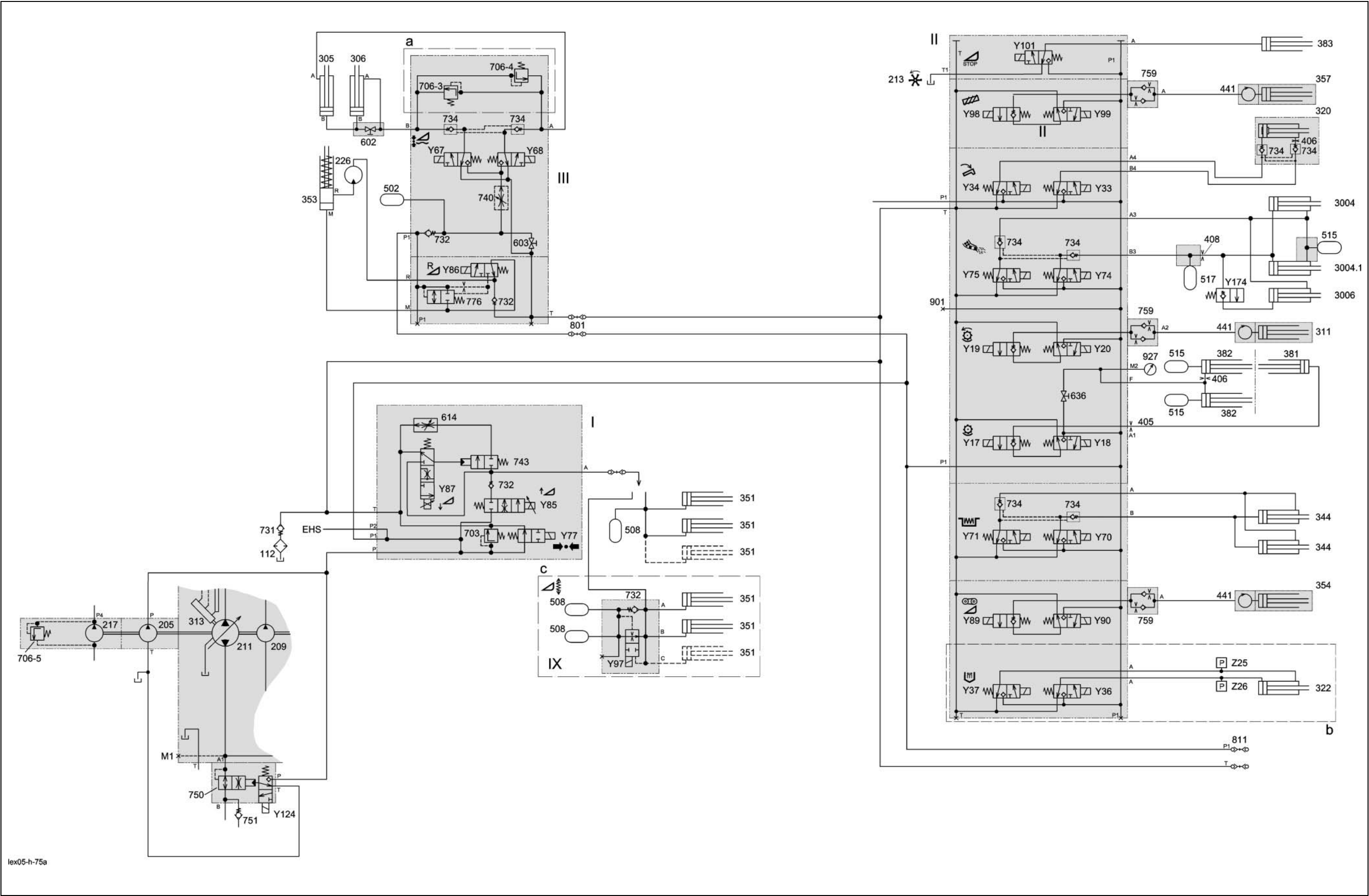
### **3.1.5**

#### **Working Hydraulics Circuit Diagram of Rotor Machines**

- LEXION 570 up to serial no. 585 00162

with radial spreader

3.1.5 Working Hydraulics Circuit Diagram of Rotor Machines  
LEXION 570 with radial spreader, up to serial no. 585 00162





### **3.1.6**

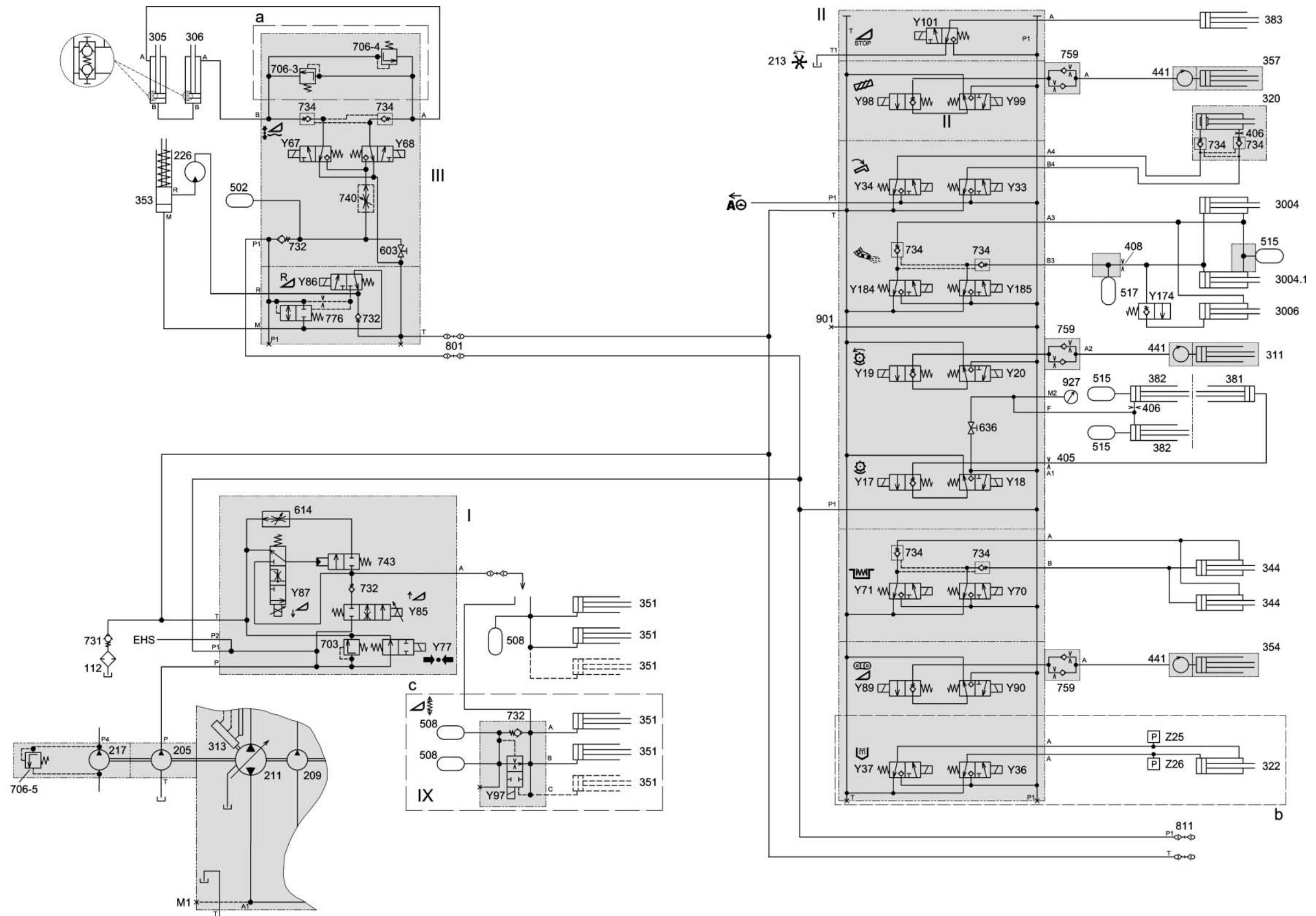
#### **Working Hydraulics Circuit Diagram of Rotor Machines**

- LEXION 570 from serial no. 585 00163

with radial spreader

### 3.1.6 Working Hydraulics Circuit Diagram of Rotor Machines

LEXION 570 with radial spreader, from serial no. 585 00163



lex05-h-75b

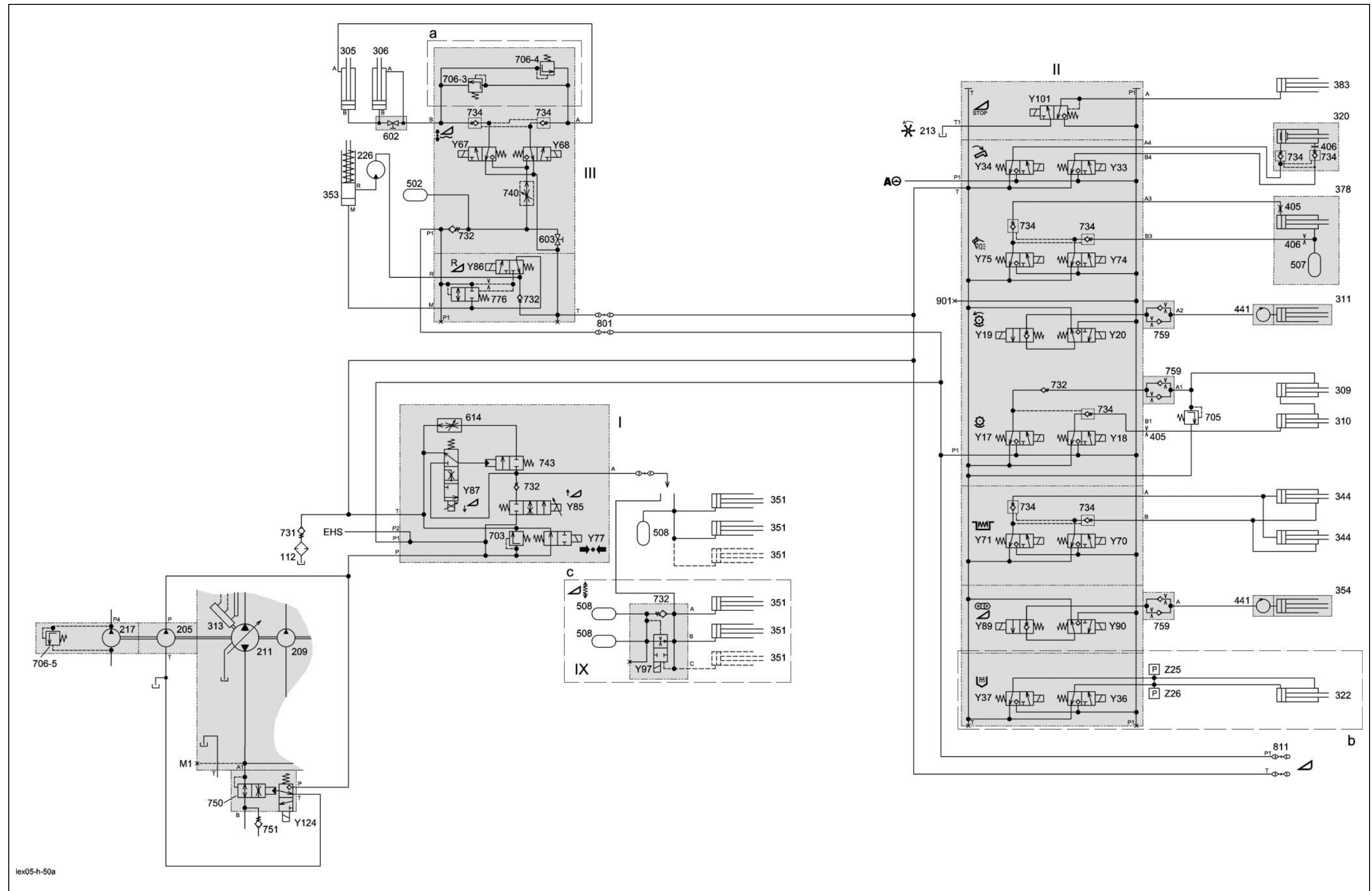
### **3.1.7**

#### **Working Hydraulics Circuit Diagram of Straw Walker Machines**

- LEXION 560-510 up to serial no. 584 00895  
583 00298

### 3.1.7 Working Hydraulics Circuit Diagram of Straw Walker Machines

LEXION 560-510 up to serial no. 584 00895, 583 00298

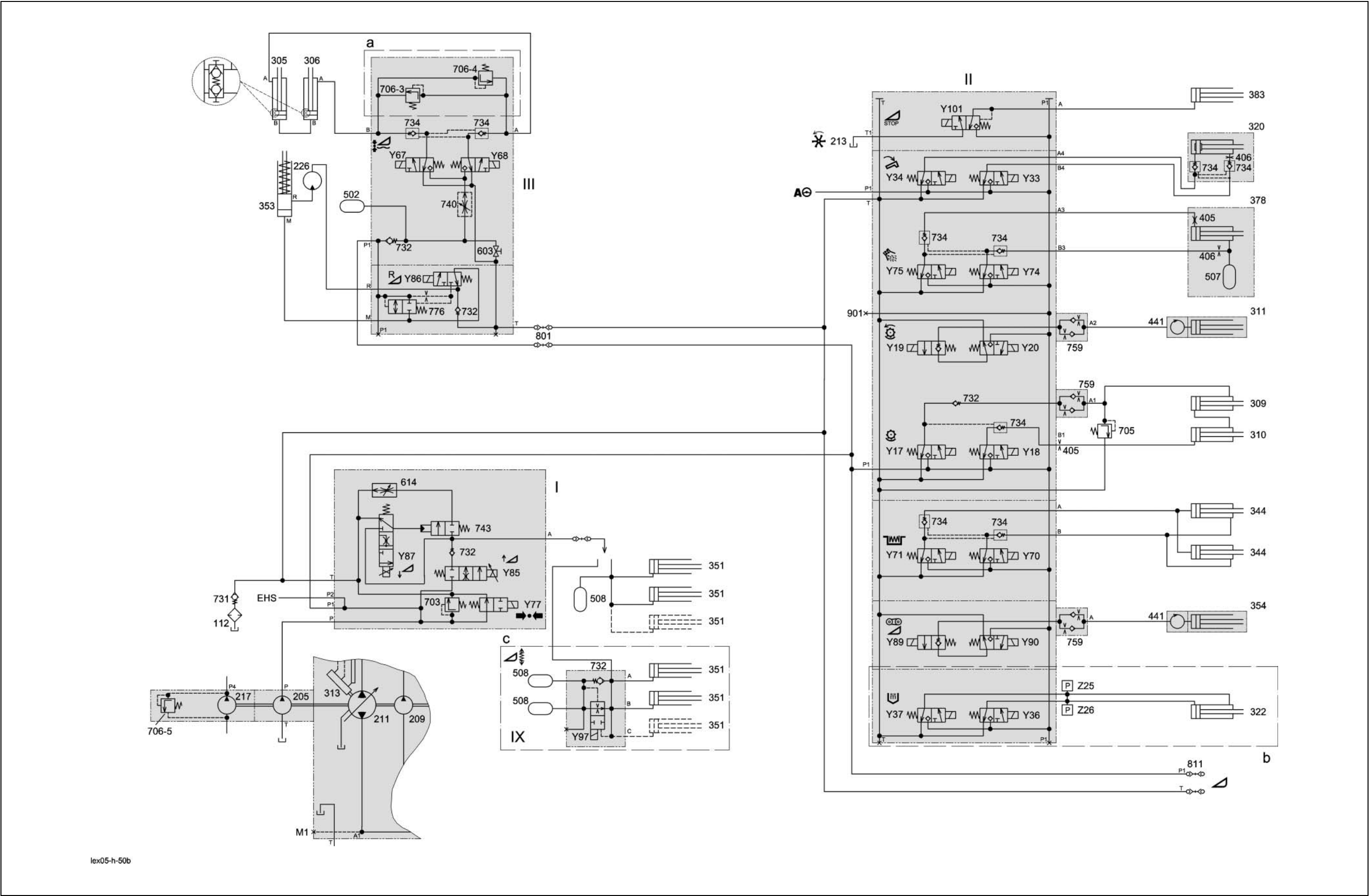


### **3.1.8**

#### **Working Hydraulics Circuit Diagram of Straw Walker Machines**

- LEXION 560-510 from serial no. 584 00896  
583 00299

3.1.8 Working Hydraulics Circuit Diagram of Straw Walker Machines  
LEXION 560-510 from serial no. 584 00896, 583 00299



### **3.1.9**

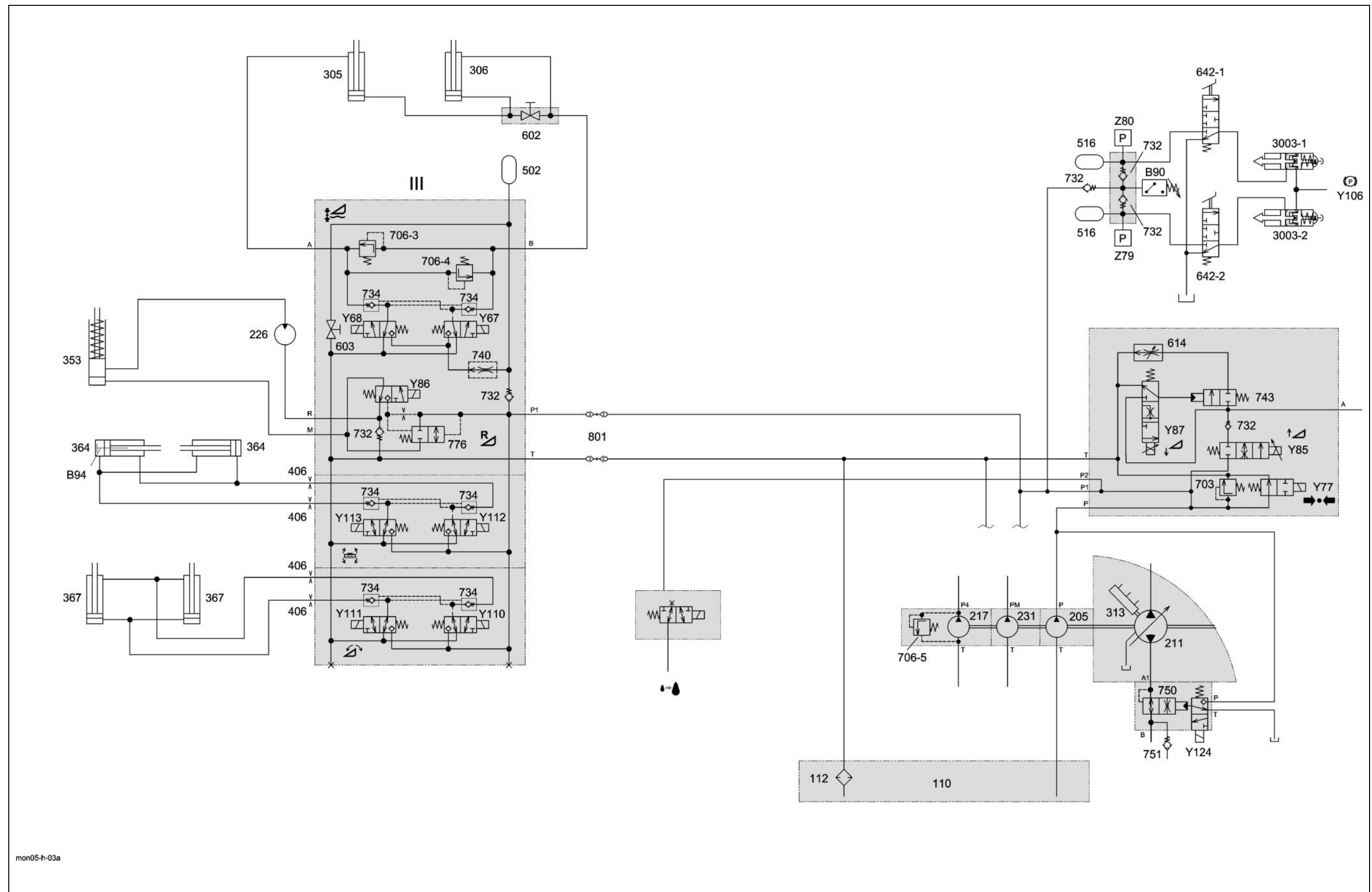
#### **Montana working hydraulics circuit diagram**

LEXION Montana 570-520

up to serial no.	582 00051
	581 00027
	580 00028

### 3.1.9 Working hydraulics circuit diagram

LEXION Montana 570-520 up to serial no. 582 00051, 581 00027, 580 00028





### **3.1.10**

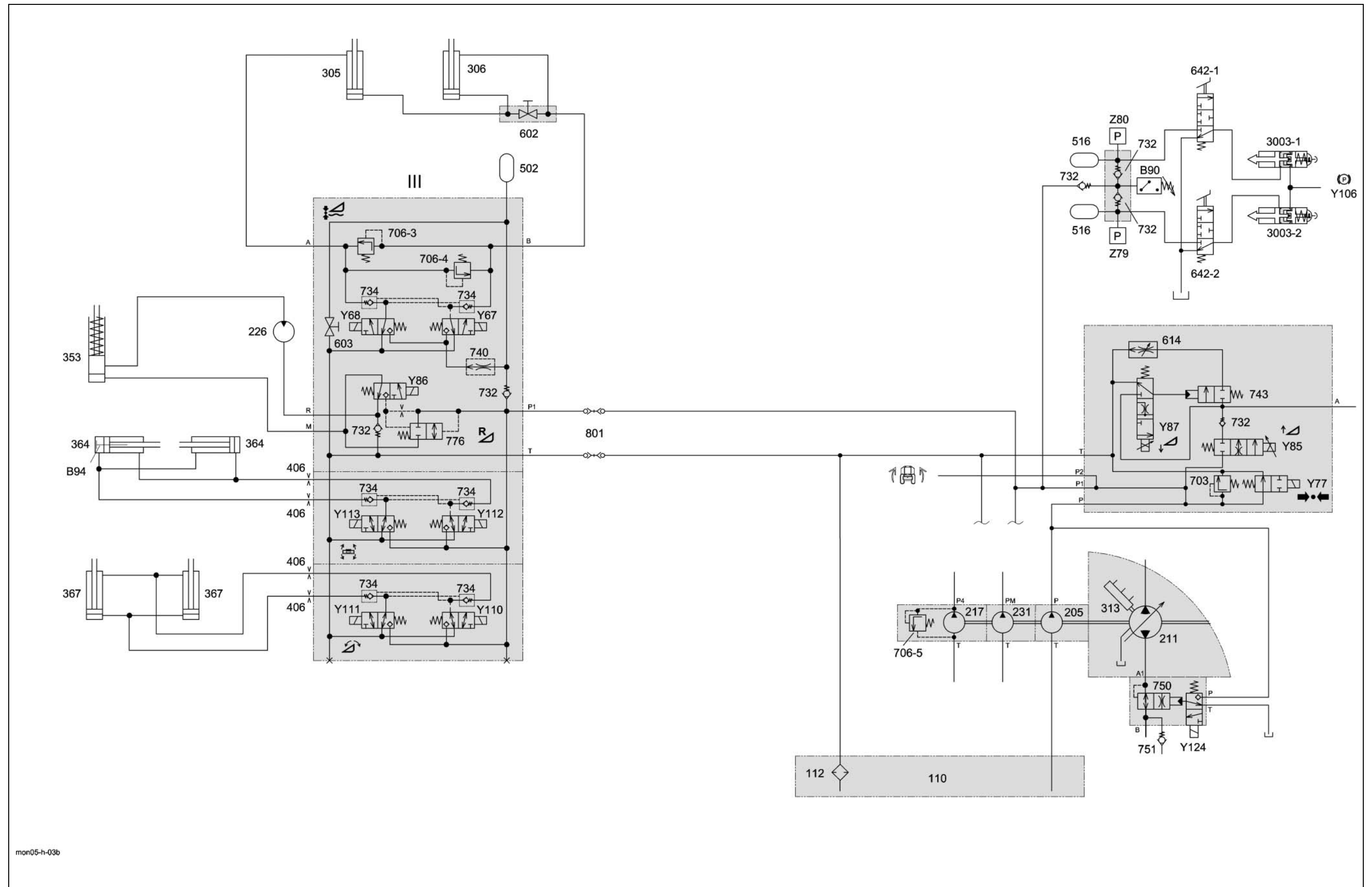
#### **Montana Working Hydraulics Circuit Diagram**

LEXION Montana 570-520

from serial no. 581 00027 to 581 00037

### 3.1.10 Working hydraulics circuit diagram

LEXION Montana 570-520 from serial no. 581 00027 to 581 00037



### **3.1.11**

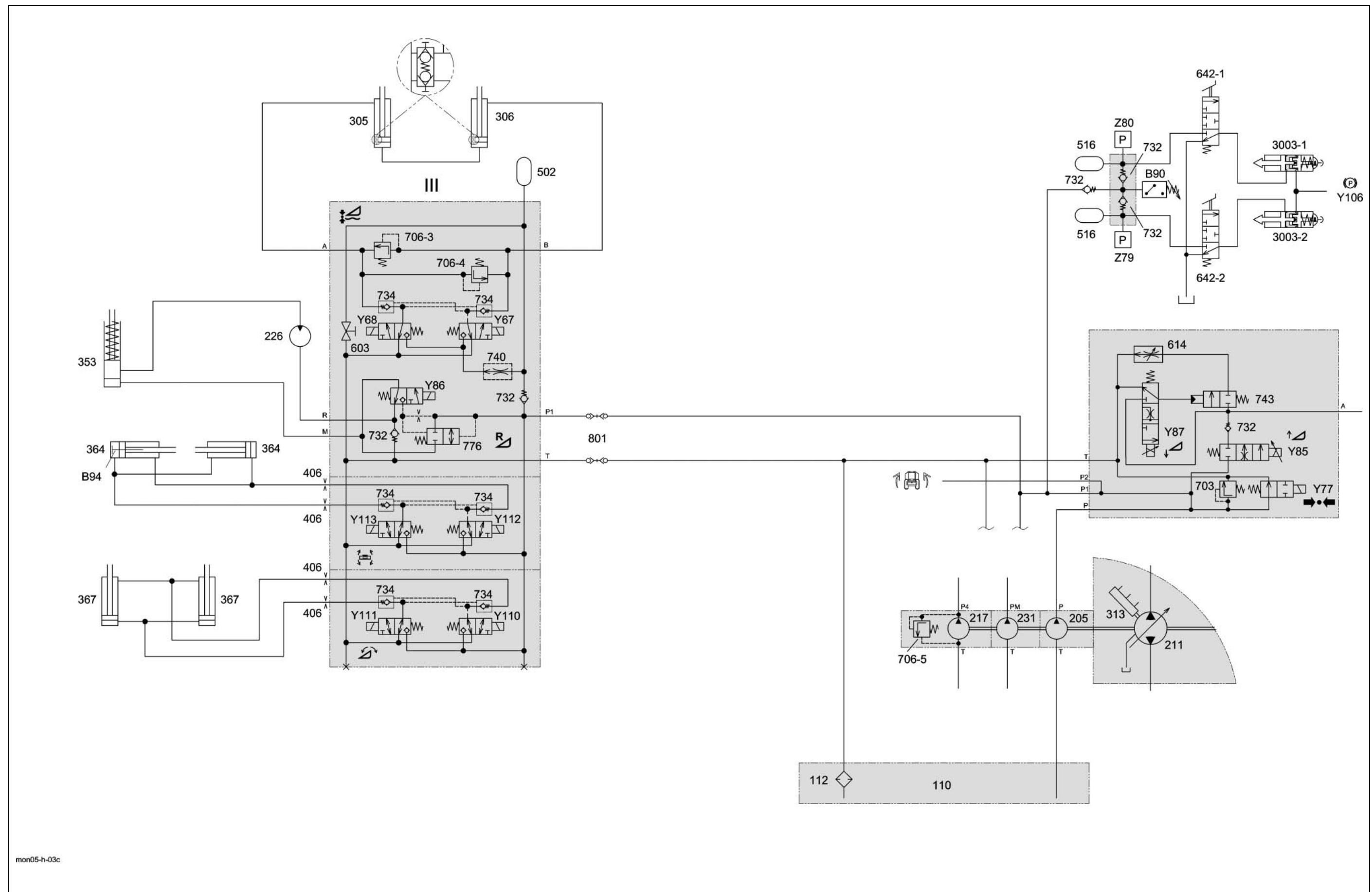
#### **Montana working hydraulics circuit diagram**

LEXION Montana 570-520

from serial no.	582 00052
	581 00038
	580 00029

### 3.1.11 Working hydraulics circuit diagram

LEXION Montana 570-520 from serial no. 582 00052, 581 00038, 580 00029



**Key to diagram:**

110	Oil tank
112	Sieve filter
205	Working hydraulics gear pump 14 / 19 cm <sup>3</sup> /rev.
209	Ground drive feed pump 26 cm <sup>3</sup> /rev.
211	Ground drive variable displacement pump OMM20
213	Reel drive pump 15 cm <sup>3</sup> /rev.
226	Reverse front attachment hydraulic motor OMR 200
231	Montana axle control system pump
305	Cross levelling right hydraulic cylinder
306	Cross levelling left hydraulic cylinder
309	Concave adjustment left hydraulic cylinder
310	Concave adjustment right hydraulic cylinder
311	Threshing drum variable-speed drive hydraulic cylinder
313	Ground drive pump servo control hydraulic cylinder
320	Swing grain tank unloading tube hydraulic cylinder
322	Grain tank unloading aid hydraulic cylinder
344	Cutterbar spring lock hydraulic cylinder
348	Straw chopper position hydraulic cylinder
351	Raise/lower front attachment hydraulic cylinder
353	Reverse front attachment hydraulic cylinder
354	Front attachment variable-speed drive hydraulic cylinder
357	Rotor variator variable-speed drive hydraulic cylinder
364	Rotate front attachment frame hydraulic cylinder
367	Cutting angle adjustment hydraulic cylinder
378	Swathing flap hydraulic cylinder
381	Concave adjustment hydraulic cylinder
382	Concave overload hydraulic cylinder
383	Front attachment quick stop hydraulic cylinder
3003-1	Service brake / Parking brake right hydraulic cylinder
3003-2	Service brake / Parking brake left hydraulic cylinder
3004	Radial spreader working/swathing position hydraulic cylinder
3006	Radial spreader transport position hydraulic cylinder
3029	Grain tank cover side panels hydraulic cylinder
3030	Grain tank cover front/rear hydraulic cylinder
405	Orifice plate Ø 0.6 mm
406	Orifice plate Ø 0.8 mm
441	Rotary coupling

<b>Key to diagram:</b>	502	Cross levelling accumulator 0.7 l / 80 bar
	507	Straw chopper, uni-spreader position accumulator
	508	Front attachment dampening accumulator – 0.6 l / 180 bar for passive front attachment dampening 0.75 l / 80 bar for active front attachment dampening
	515	Accumulator
	516	Service brake accumulator 0.75 l / 80 bar
	517	Accumulator working position 0.075 l / 60 bar
	602	Shut-off valve
	603	Pressure relief bolt
	614	Flow control valve 5 - 50 l/min
	636	Concave overload system shut-off valve
	642-1	Service brake valve, right
	642-2	Service brake valve, left
	703	Pressure relief valve 180 <sup>+15</sup> bar
	705	Pressure relief valve 90±5 bar
	706-3	Cross levelling (Montana) pressure relief valve 200 bar
	706-4	Cross levelling (Montana) pressure relief valve 200 bar
	706-5	Rotary chaff screen pressure relief valve 150 bar
	731	Return line non-return valve 0.1 bar
	732	Non-return valve
	734	Non-return valve (Lock-up valve unit)
	740	Flow control valve
	743	Lower front attachment return valve (lower quickly)
	747	Double restrictor valve Ø 0.3 mm
	748	Restrictor
	750	Brake restrictor valve
	751	External feed valve (non-return valve)
	759	One-way restrictor valve, two-sided
	776	Reversing connecting valve
	801	Front attachment quick release coupling (P/T)
	811	Front attachment multi-coupling
	811	Front attachment multi-coupling
	901	Working hydraulics measuring port
	927	Concave overload system pressure gauge

**Key to diagram:**

Y17	Concave narrow solenoid valve (close)
Y18	Concave wide solenoid valve (open)
Y19	Threshing drum variable-speed drive slow solenoid valve
Y20	Threshing drum variable-speed drive fast solenoid valve
Y33	Solenoid valve Swinging out the grain tank unloading tube
Y34	Solenoid valve Swinging in the grain tank unloading tube
Y36	Grain tank unloading aid forward solenoid valve (120 bar)
Y37	Grain tank unloading aid backward solenoid valve (80 bar)
Y67	Front attachment cross levelling left solenoid valve
Y68	Front attachment cross levelling right solenoid valve
Y70	Unlock cutterbar spring solenoid valve
Y71	Lock cutterbar spring solenoid valve
Y74	Straw chopper in working position solenoid valve
Y75	Straw chopper in rest position solenoid valve
Y77	Master valve solenoid valve
Y81	Uni-spreader in working position solenoid valve
Y82	Uni-spreader in transport position solenoid valve
Y85	Raise front attachment solenoid valve
Y86	Reverse front attachment solenoid valve
Y87	Lower front attachment solenoid valve
Y89	Front attachment variable-speed drive slow solenoid valve
Y90	Front attachment variable-speed drive fast solenoid valve
Y97	Front attachment dampening solenoid valve
Y98	Rotor variable-speed drive slow solenoid valve
Y99	Rotor variable-speed drive fast solenoid valve
Y101	Front attachment quick stop solenoid coil
Y110	Raise cutting angle solenoid valve
Y111	Lower cutting angle solenoid valve
Y112	Rotate front attachment to the right solenoid valve
Y113	Rotate front attachment to the left solenoid valve
Y124	Ground drive hydraulic motor brake restrictor (HBM) solenoid valve
Y174	Radial spreader transport position solenoid valve
Y182	Open grain tank extension solenoid valve
Y183	Close grain tank extension solenoid valve
Y184	Radial spreader swathing position solenoid valve
Y185	Radial spreader working/transport position solenoid valve
Z20	Hydraulic oil temperature actual value switch
Z25	Actual value switch
Z26	Actual value switch
Z79	Left brake circuit pressure actual value switch
Z80	Right brake circuit pressure actual value switch
I	Main valve block
II	Working hydraulics valve block
III	AUTOCONTOUR / Reverse valve block
IX	Front attachment dampening valve block

**Key to diagram:**

A	Consumer port
B	Consumer port
P	Master valve feed flow
P1	Parallel port of directional control valves downstream of master valve
T	Tank port (return line)
a	Valve block with integrated pressure relief valve Series equipment for MONTANA machines, otherwise available as an option
b	Grain tank unloading valve block (option)
c	Option
M1	High pressure forward measuring port
EHS	Electro-hydraulic gearshift



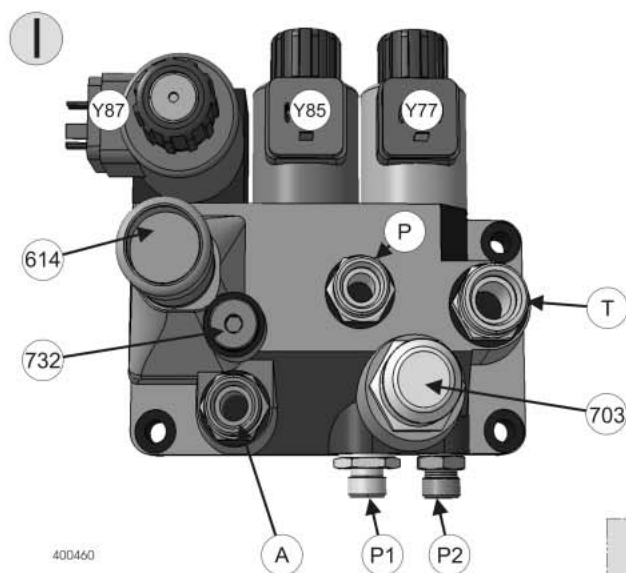
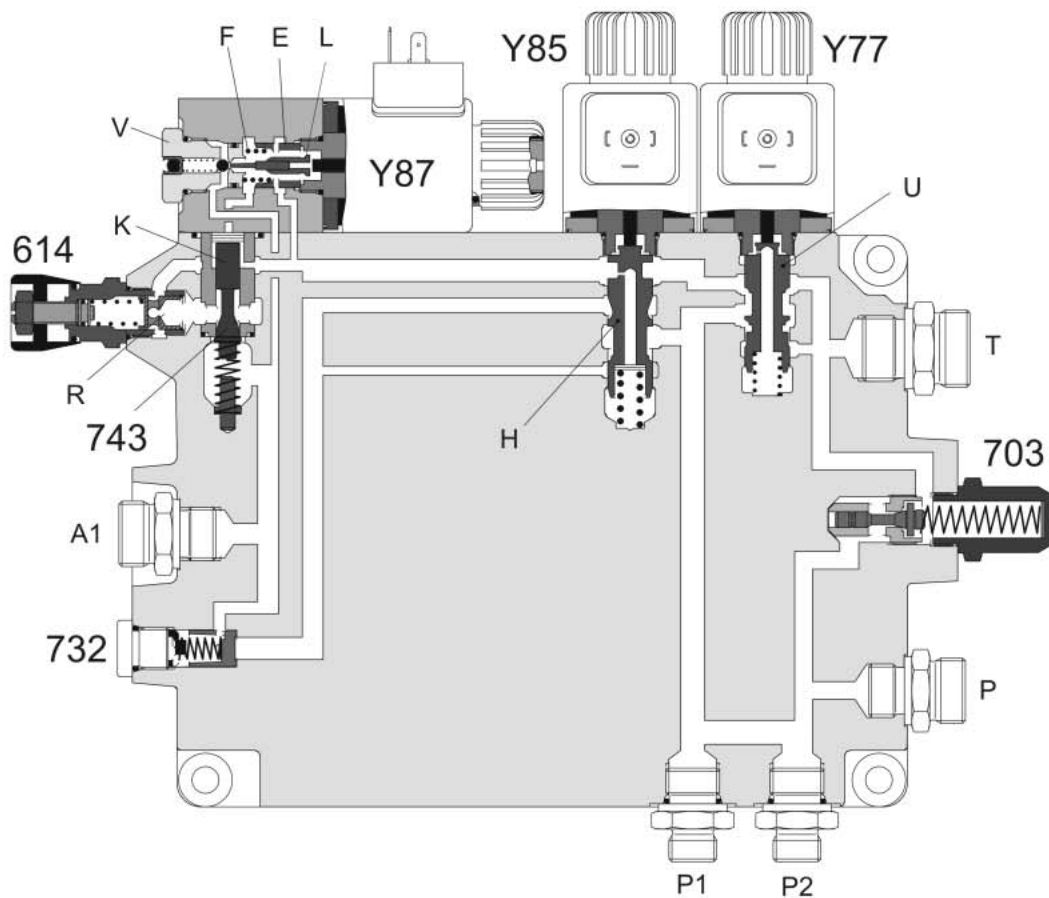
## 3.2

### Main Valve

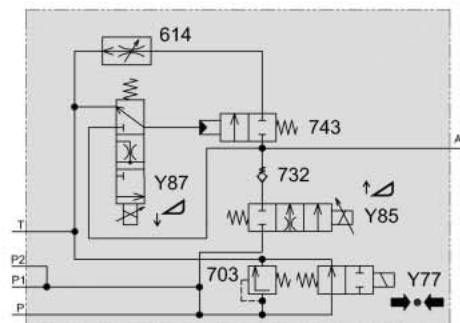
<b>3.2.1</b>	<b>Main Valve .....</b>	<b>3-32</b>
	with master valve, pressure relief valve, raise/lower front attachment.....	3-32
	Function of master valve .....	3-35
	Raise front attachment function.....	3-35
	Pulse width modulation.....	3-35
	Lower front attachment function .....	3-36
	Flow control valve.....	3-36
	Hydraulic cylinders .....	3-38

**3.2.1 Main Valve**

with master valve, pressure relief valve, raise/lower front attachment



400460



400322

**Key to diagram:**

614	Flow control valve .....	5 – 50 l/min
703	Pressure relief valve .....	180 <sup>+15</sup> bar
732	Non-return valve (inlet valve)	
743	Lower front attachment pilot valve	
Y77	Working hydraulics master valve solenoid coil	
Y85	Raise front attachment solenoid valve	
Y87	Lower front attachment solenoid valve	
A1	Raise/lower front attachment hydraulic cylinder	
P1	Working hydraulics pump port	
P2	Parallel port for working hydraulics of other directional control valves	
T	Tank port	
E	Pilot spool	
F	Compression spring	
H	Front attachment raise spool	
K	Front attachment quick lower piston	
L	Lower front attachment spool	
R	Control spool .....	5 – 50 l/min
U	Master valve control spool	
V	Pilot valve	

**Description of function:**

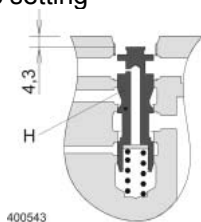
## Pressure limitation

The spring in the pressure relief valve (703) is pre-stressed for a system pressure of **180<sup>+15</sup> bar**. The pressure setting may be modified by removing or adding shims.

- 0.5 mm shim corresponds to approx. 10 bar
- 1.2 mm shim corresponds to approx. 23 bar

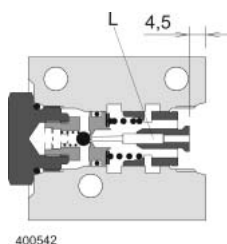
**Note:** The above values refer to a rated pressure of 180 bar and may deviate, depending on the actual system. Each time the setting has been modified, the system pressure must be checked.

## Basic setting



To ensure the position of spool (H) for the function "Raise front attachment - slow", the dimension from the top edge of the spool (H) to the body must be **4.3 mm** with the coil core (Y85) removed. The position may be corrected by removing or adding shims above the compression spring.

A weaker compressed spring – as compared to the spool (H) - is located below the spool of the circulation shut-off valve (U).



In order to guarantee the "Front attachment lower" function, the clearance between the top edge of spool (L) and the housing must be **4.5 mm** with the coil core (Y87) removed. The position may be corrected by removing or adding shims.

Spare part no: 0.1 mm = 218 886.0  
0.2 mm = 218 887.0

The drop rate of the front attachment can be adjusted to a drop time of **5 - 6 sec.** over the entire stroke range on the flow control valve (614).

**Description of function:**

## Function of master valve

The master valve (Y77) blocks the circulating volume flow from P to T of the open hydraulic system when a working hydraulics function has been actuated. Single-acting functions are an exception to this if the consumer is relieved to the tank.

In neutral position, the master valve (Y77) is not actuated, making the oil flow back to the tank via the ring channels on the spool (U). Due to the large channel cross-section, the circulation pressure is very low.

When pressure is successfully built up at a consumer, the master valve (Y77) is actuated simultaneously with the directional control valve of the corresponding function. Now spool (U) closes the connection from P to T, and the top ring channel being closed first in order to achieve smooth switching-over.

The pressure relief valve (703) opens at a maximum system pressure of  $180 \pm 15$  bar and relieves the pressure to the tank.

## Raise front attachment function

**slow**

When the "Raise - slow" function is used, the solenoid valve (Y85) is actuated with a pulsed voltage of 80 Hz and approx. 50% PWM (pulse width modulation). At the same time, the master valve (Y77) is actuated with 12 V DC.

This pulse circuit makes the spool (H) move only to such an extent that the oil must flow via the restrictor pocket inside the spool and the bottom ring channel. The volume flow thus restricted is directed to the consumer port (A1) via the non-return valve (732) and slowly raises the front attachment.

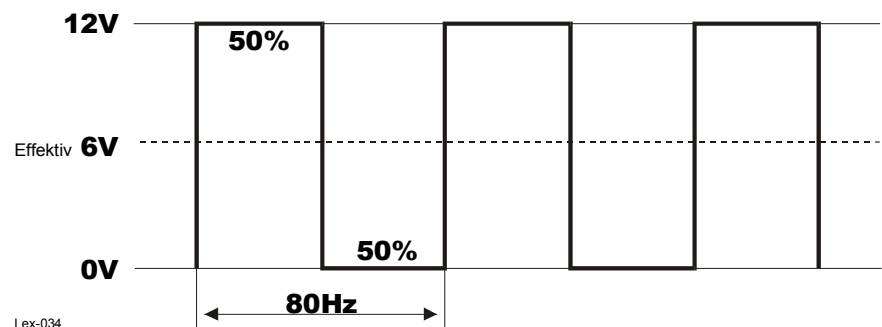
The residual oil flows back to the tank via the pressure relief valve (703).

**fast**

When the "Raise – fast" function is used, the directional control valve (Y85) and the master valve (Y77) are actuated with 12 V DC.

The spool (H) is moved to its end position, making oil flow via both ring channels on the spool (H). The full volume flow is directed to the consumer port (A1) via the non-return valve (732) and quickly raises the front attachment.

## Pulse width modulation



**Description of function:**Lower front attachment  
function**slow**

When the "Lower - slow" function is used, only the directional control valve (Y87) is actuated by the CAC module with a pulsed voltage of 80 Hz and 45% PWM (pulse width modulation).

This pulsed circuit is sufficient to open the spherical seat in the pilot valve (V), however, the force is too low to overcome the spring force (F). Spool (E) therefore cannot close the ring channel to the return line. The load caused by the front attachment in port (A) displaces the oil via the spherical seat and the bores of spool (E) into the return channel to the tank (T).

The small cross-section at the spherical seat now restricts the volume flow, making the front attachment lower slowly.

**fast**

When the "Lower – fast" function is used, only the directional control valve (Y87) is actuated with 12 V DC.

The spherical seat in pilot valve (V) is opened and the spring force (F) is overcome through the force of the solenoid. The spool (E) closes the ring channel to the return line, making the load pressure of the front attachment act on the piston top side (K) and open the pilot valve (743). The oil is now displaced by the front attachment via the pilot valve (743) and the control spool (R) into the return line to the tank.

The drop rate of the front attachment here mainly depends on the setting of the flow control valve (614).

## Flow control valve

When the "Lower front attachment – fast" function is used, the oil displaced via port A flows to the tank (T) through the restrictor in the control spool of the flow control valve (614).

This creates a ram pressure ahead of the control spool, making the latter move against the control spring and restrict the return channel to the tank (T) as a function of the load pressure.

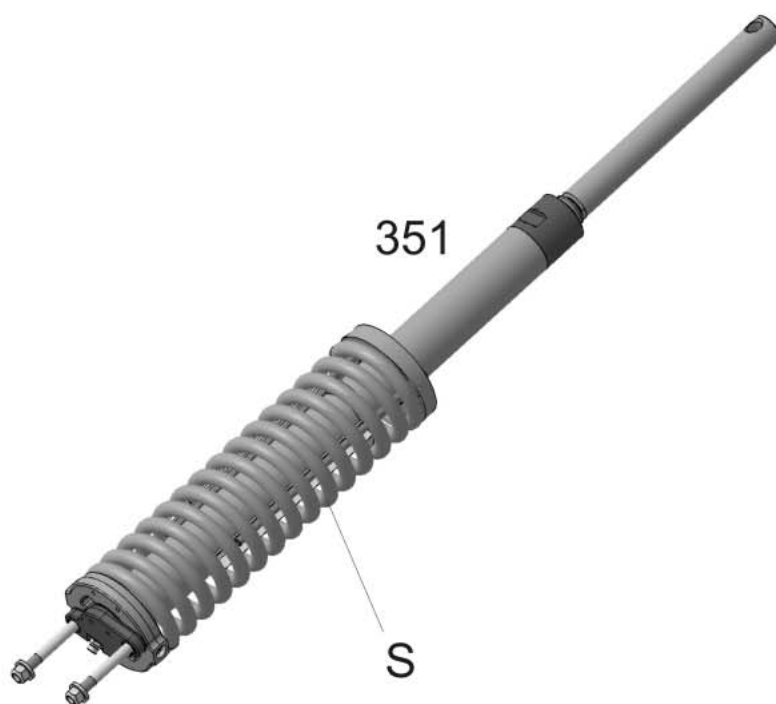
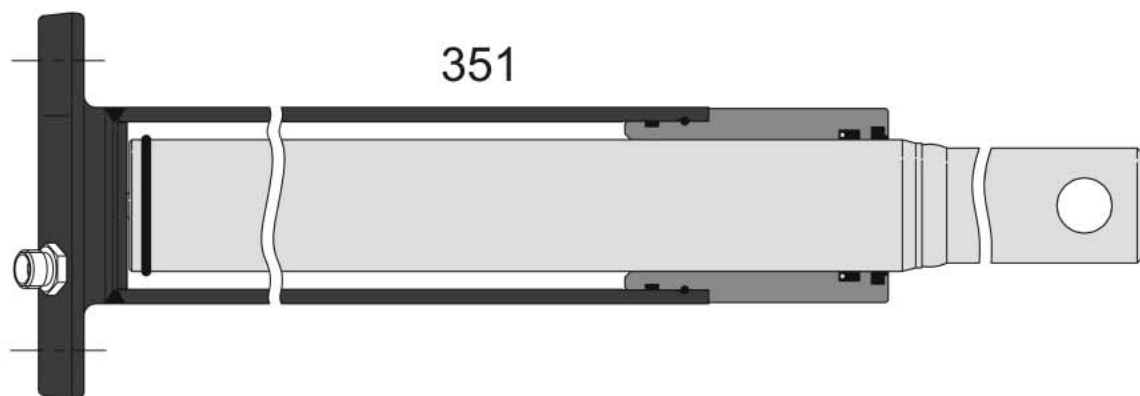
When the load pressure in port A changes, both the volume flow through the restrictor and the load pressure against the control spool change, too, and consequently also the return channel cross-section.

This control function keeps the volume flow and therefore the front attachment drop rate constant, independent of the load pressure.

The front attachment drop rate is adjusted merely by the pre-stress of the control spring at the handwheel.

Relieve tension of control spring	= lower drop rate
Tensioning the control spring	= increase lower speed

**Notes:**

**Raise / Lower Front Attachment**  
Hydraulic cylinders

400530



**Key to diagram:**

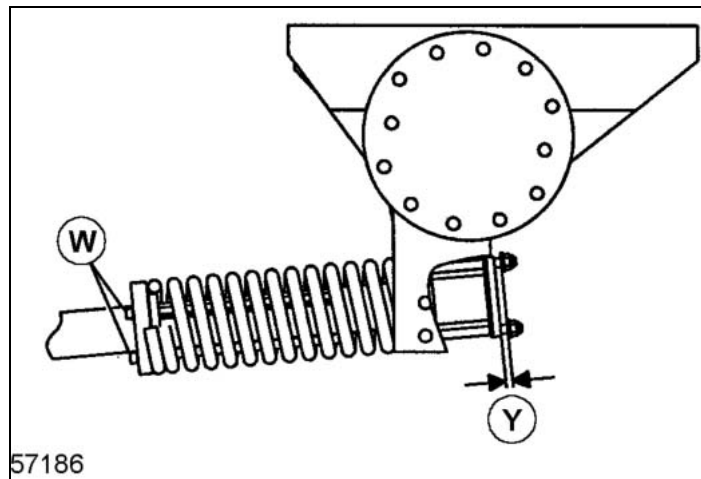
- 351 Raise/lower front attachment hydraulic cylinder  
S Cutterbar spring

**Description of function:**

## Cutterbar cylinder setting

Flawless function of AUTO-CONTOUR and CONTOUR requires correct basic setting of the cutterbar springs (S). Since the cutterbar cylinders and consequently the cutterbar are supported by the cutterbar springs (S), the spring force determines the respective ground pressure the cutterbar exerts on the ground. In this setting, a force of approx. 500 Nm (approx. 50 kg) exerted by the cutterbar on the ground with the spring compressed should not be exceeded.

- Cutterbar is installed
- Reel in centre position
- Lower cutterbar to approx. 100 mm above the ground
- Set pre-load of compression springs at cheese-head screws (W)
- Clearance (Y) between cylinder bottom plate and washer with nut:  
**5 - 10 mm**  
(Increase clearance = turn screw in  
Reduce clearance = turn screw out)





### 3.3

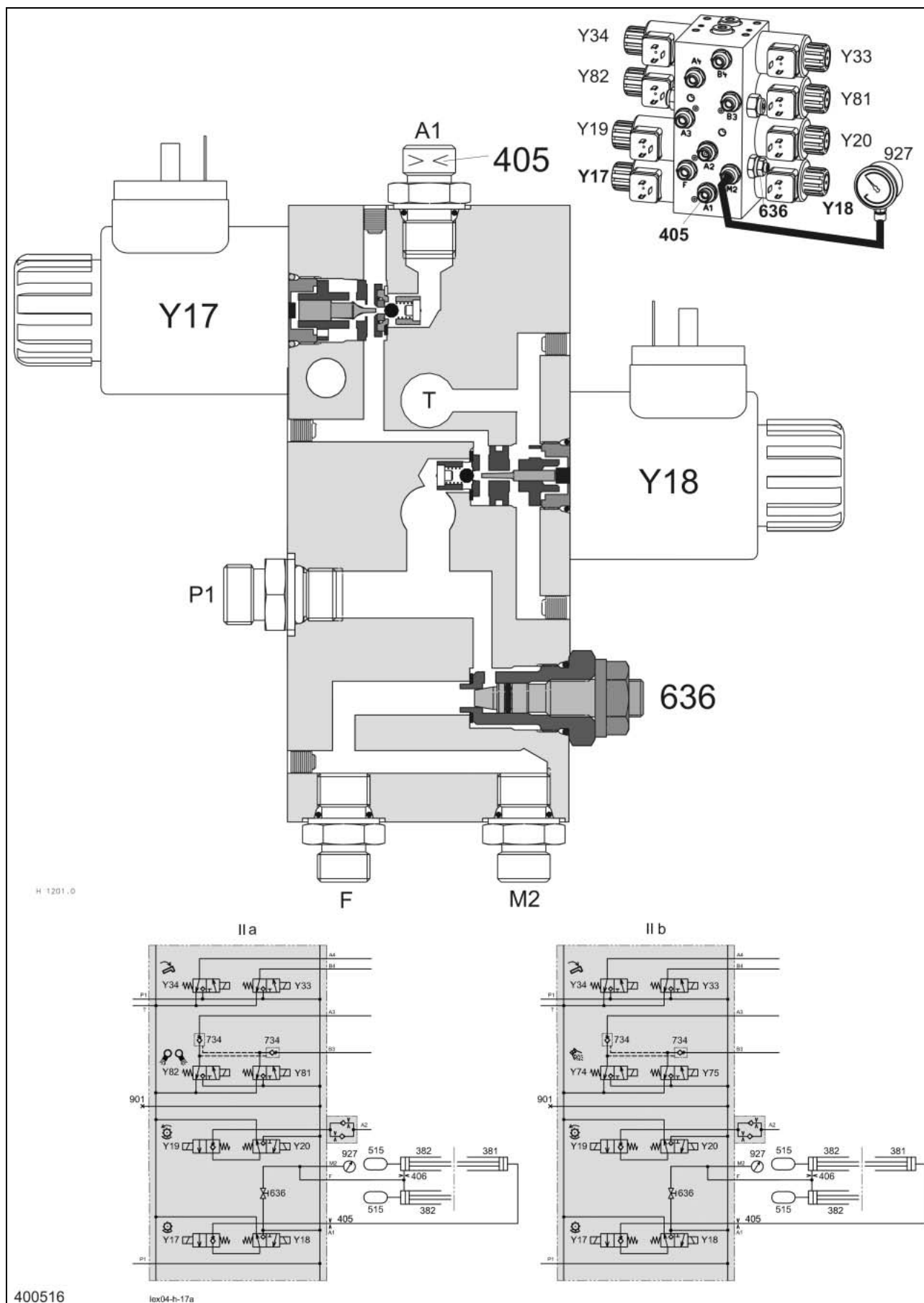
## Concave Adjustment

<b>3.3.1</b>	<b>Concave Adjustment - LEXION 580 / 570</b>	
	<b>Hydro-Pneumatic Overload System with Filling Valve .....</b>	<b>3-42</b>
	4/3 way solenoid valve with lock-up valve unit .....	3-42
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<b>3.3.2</b>	<b>Concave Adjustment - LEXION 560 - 510</b>	
	<b>Hydraulic Overload System without Filling Valve .....</b>	<b>3-48</b>
	4/3 way solenoid valve with lock-up valve unit .....	3-48
	Pressure relief valve, hydraulic cylinder with purge valves - LEXION 560 – 510 .....	3-50

### 3.3.1 Concave Adjustment - LEXION 580 / 570

#### Hydro-Pneumatic Overload System with Filling Valve

4/3 way solenoid valve with lock-up valve unit



**Key to diagram:**

381	Concave adjustment hydraulic cylinder
382	Concave overload hydraulic cylinder
405	Orifice plate E.....Ø 0.6 mm
406	Orifice plate F.....Ø 0.8 mm
515	Accumulator .....0.5 l / 110 bar
636	Concave overload system shut-off valve
927	Concave overload system pressure gauge
U26	Fill accumulator switch
Y17	Concave narrow solenoid valve (close)
Y18	Concave wide solenoid valve (open)
Y19	Threshing drum variable-speed drive slow solenoid valve
Y20	Threshing drum variable-speed drive fast solenoid valve
Y33	Grain tank unloading tube swing out solenoid valve
Y34	Grain tank unloading tube swing in solenoid valve
Y74	Straw chopper in rest position solenoid valve
Y75	Straw chopper in working position solenoid valve
Y81	Uni-spreader fan in working position solenoid valve
Y82	Uni-spreader fan in transport position solenoid valve
Y184	Radial spreader swathing position
Y185	Radial spreader working/transport position
IIa	Working hydraulics valve block LEXION 580
IIb	Working hydraulics valve block LEXION 570
T	Tank port
P1	Pump via master valve port
A1	Concave adjustment hydraulic cylinder port
A4	Concave narrow (left) hydraulic cylinder port
B4	Concave wide (right) hydraulic cylinder port
F	Concave overload hydraulic cylinder port
K	Piston
M2	Concave overload system pressure gauge port
V	Valve insert

**Description of function:**

Concave pre-stress (hydro-pneumatic overload system)

In order to avoid threshing drum blocking in case of threshing mechanism overload, the concave is pre-stressed hydraulically to **130<sup>+5</sup> bar** by an accumulator (Concave closed).

This pre-stress is set by means of the concave overload system shut-off valve (636) and is shown on the pressure gauge (927).

**Reducing the pre-stress**

Opening the shut-off valve (636) relieves the system pressure to the tank – the pressure falls.

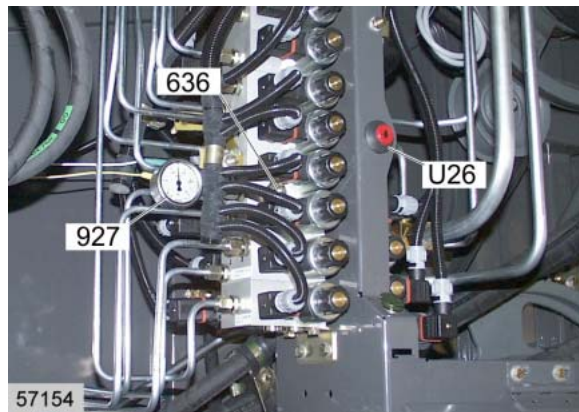
**Increasing the  
pre-stress**

Opening the shut-off valve (636) in connection with actuating the Fill accumulator switch (U26) will increase the pressure in the hydro-pneumatic overload system.

In this process, the master valve (Y77) and the concave narrow solenoid valve (Y17) are actuated at the same time. This builds up system pressure and at the same time moves the concave adjustment hydraulic cylinder (381) to its narrowest position due to the pressure relief.

After opening the concave overload system shut-off valve (636), system pressure goes into the accumulator and thus pre-stresses the concave hydraulically.

When the pressure reaches 150 bar (on pressure gauge 927), the shut-off valve (636) is closed and the Fill accumulator switch (U26) is not actuated any more. After this, the pressure is reduced to 130<sup>+5</sup> bar by controlled opening of shut-off valve (636).



**Description of function:**

Concave narrow (close) function

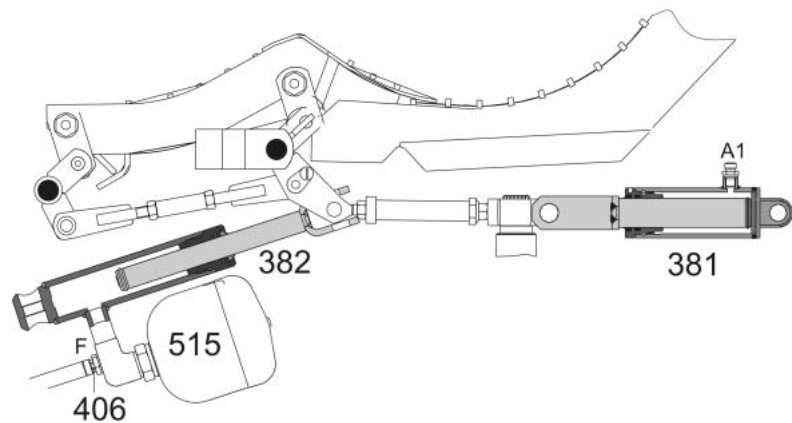
The solenoid valve (Y17) is actuated. This provides the connection from the concave adjustment hydraulic cylinder (381) to the tank. The concave overload hydraulic cylinders (382) pre-stressed to 130<sup>+5</sup> bar now close the concave.

Concave wide (open) function

Pressure build-up in the system is required for opening the concave. This is why the concave wide solenoid valve (Y18) and the master valve (Y77) are actuated at the same time.

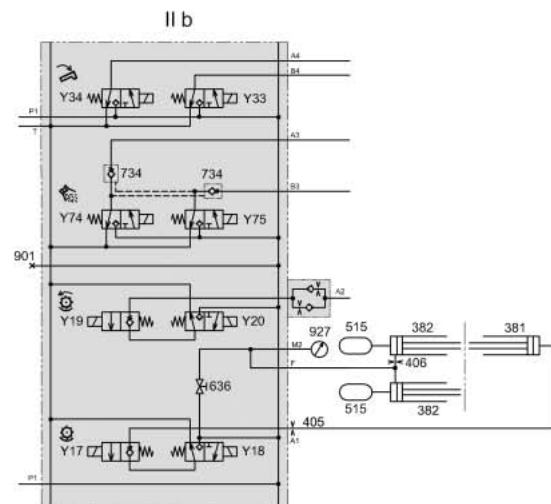
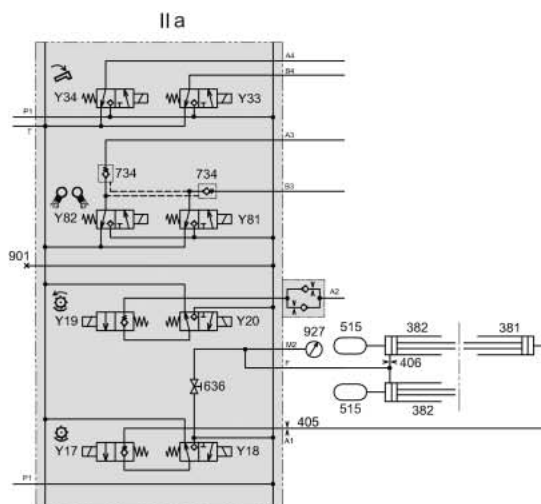
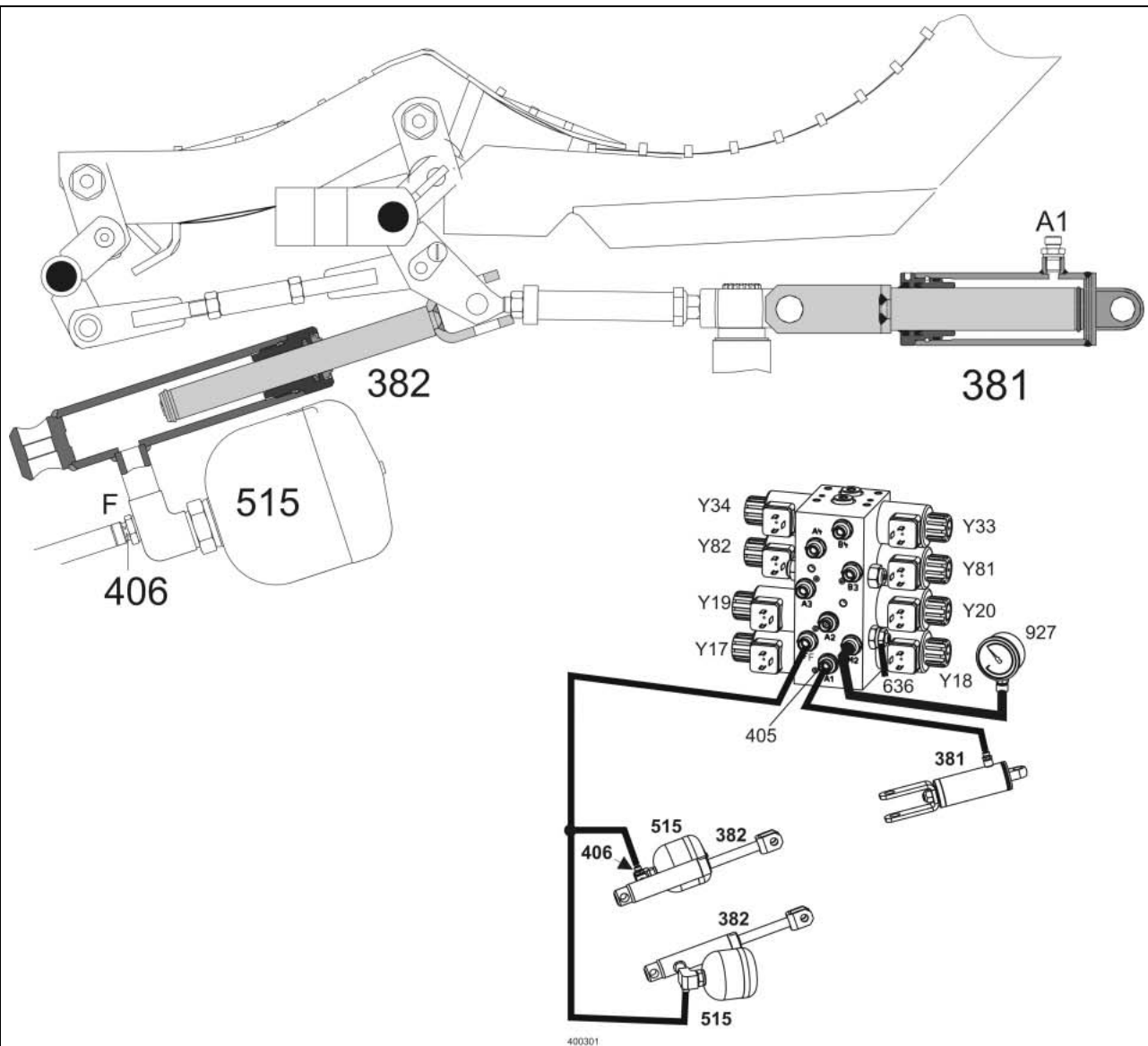
When opening the concave, the concave adjustment hydraulic cylinder (381) counteracts the concave overload hydraulic cylinder (382) and thus the applied hydraulic pre-load (130 bar).

An increase of the pre-loading pressure when opening the concave is normal. The pressure is shown at the concave overload system pressure gauge (927).



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**Concave Adjustment - LEXION 580 / 570**  
**Hydro-Pneumatic Overload System with filling Valve**  
 Hydraulic cylinders



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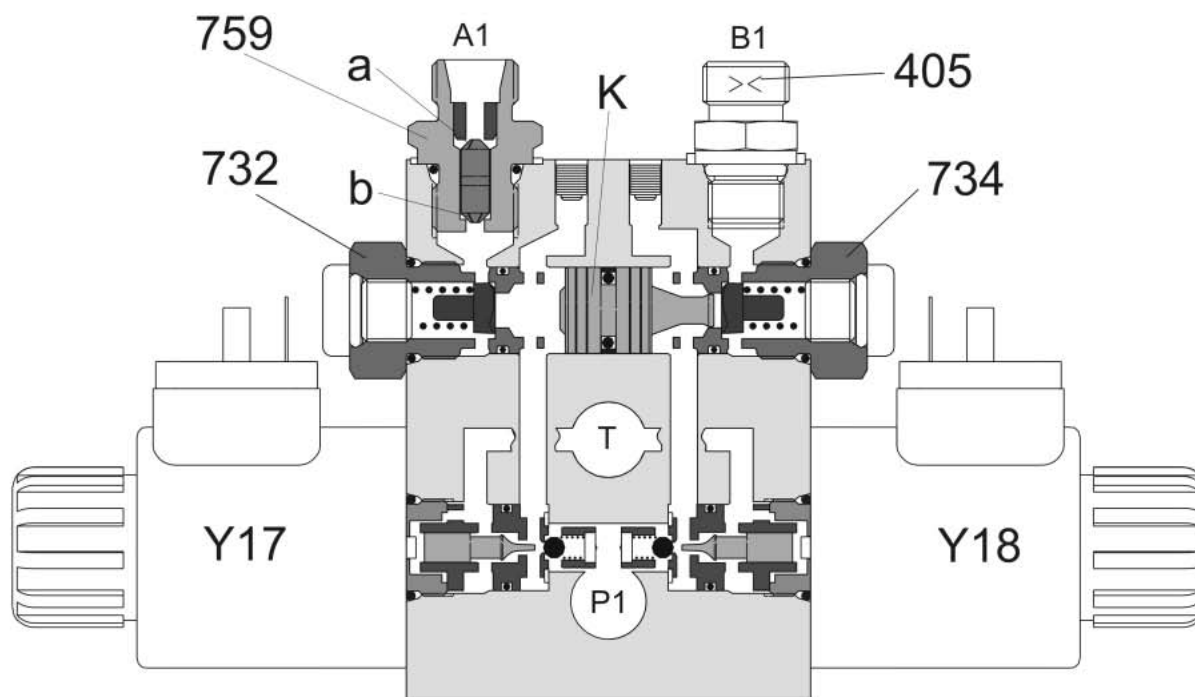
**Key to diagram:**

381	Concave adjustment hydraulic cylinder
382	Concave overload hydraulic cylinder
405	Orifice plate E.....Ø 0.6 mm
406	Orifice plate F.....0.8 mm
515	Accumulator .....0.5 l / 110 bar
636	Concave overload system shut-off valve
734	Lock-up valve unit (non-return valve)
927	Concave overload system pressure gauge
Y17	Concave narrow solenoid valve (close)
Y18	Concave wide solenoid valve (open)
Y19	Threshing drum variable-speed drive slow solenoid valve
Y20	Threshing drum variable-speed drive fast solenoid valve
Y33	Grain tank unloading tube swing out solenoid valve
Y34	Grain tank unloading tube swing in solenoid valve
Y74	Straw chopper in working position solenoid valve
Y75	Straw chopper in swathing mode solenoid valve
Y81	Uni-spreader fan in working position solenoid valve
Y82	Uni-spreader fan in transport position solenoid valve
Y184	Radial spreader swathing position
Y185	Radial spreader working/transport position
Ila	Working hydraulics valve block LEXION 580
Ilb	Working hydraulics valve block LEXION 570

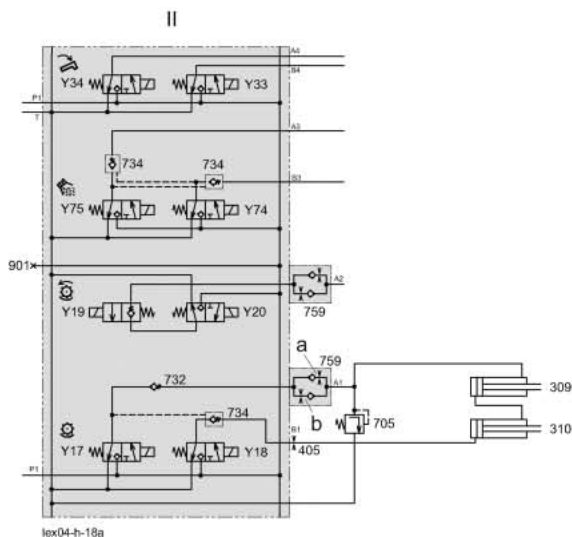
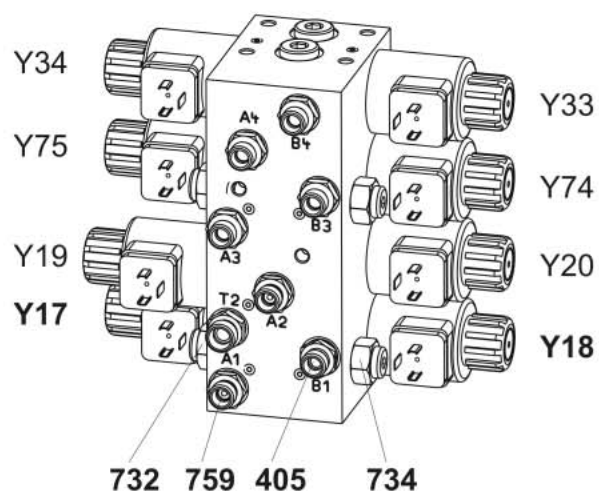
### 3.3.2 Concave Adjustment - LEXION 560 - 510

#### Hydraulic Overload System without Filling Valve

4/3 way solenoid valve with lock-up valve unit



H 1176.0



400326

lex04-h-18a

**Key to diagram:**

405	Orifice plate .....	Ø 0.6 mm
705	Pressure relief valve .....	90±5 bar
732	Non-return valve (not pilot-controlled)	
734	Non-return valve (Lock-up valve unit)	
759	One-way restrictor valve, two-sided	
Y17	Concave narrow solenoid valve (close)	
Y18	Concave wide solenoid valve (open)	
Y19	Threshing drum variable-speed drive slow solenoid valve	
Y20	Threshing drum variable-speed drive fast solenoid valve	
Y33	Grain tank unloading tube swing out solenoid valve	
Y34	Grain tank unloading tube swing in solenoid valve	
Y74	Straw chopper in working position solenoid valve	
Y75	Straw chopper in swathing mode solenoid valve	
Ilc	Working hydraulics valve block LEXION 560-510	
T	Tank port	
P1	Pump via master valve port	
A4	Concave narrow (left) hydraulic cylinder	
B4	Concave wide (right) hydraulic cylinder	
V	Valve insert	
K	Piston	

**Description of function:****Neutral function**

Both sides of the hydraulic cylinder are tightly closed by the non-return valves (732, 734).

**Concave narrow (close) function**

The solenoid valve (Y17) and the master valve are actuated at the same time. The corresponding pilot spool opens the ball in the valve insert and closes the return line to the tank. The pressure which consequently rises builds up against piston (K) and opens the non-return valve (734) at port (B1).

The return line of the hydraulic cylinder is now released to the tank via the valve insert of the solenoid valve (Y18). The pressure which rises further opens the non-return valve (732) at port (A). Volume flow now flows via port (A1) into the hydraulic cylinders which consequently retract.

**Concave wide (open) function**

The solenoid valve (Y18) and the master valve are actuated at the same time. The corresponding pilot spool opens the ball in the valve insert and closes the return line to the tank. The pressure which consequently rises builds up against piston (K), but cannot open the non-return valve (732) at port (A1).

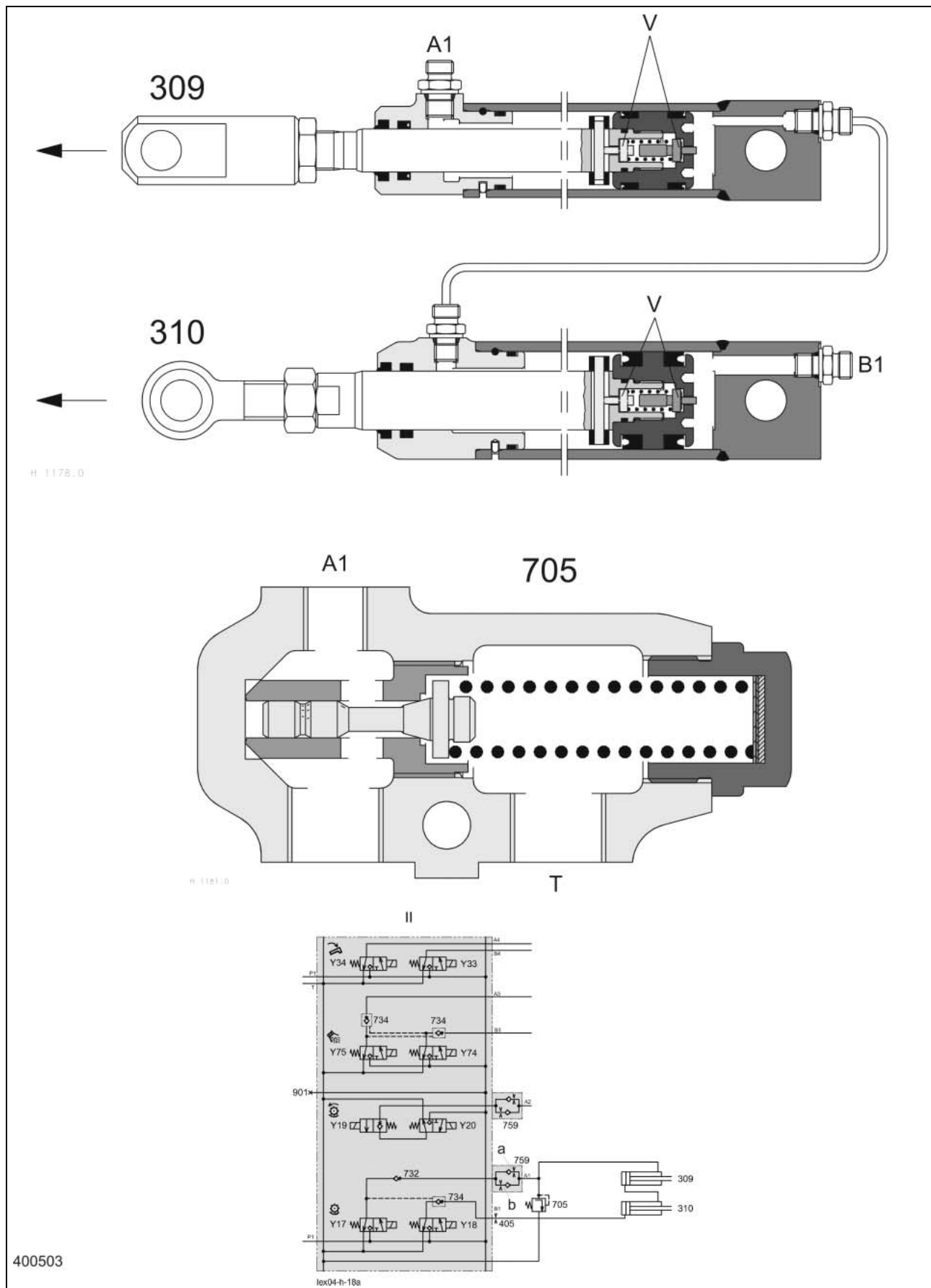
The return line of the hydraulic cylinder is therefore blocked by non-return valve (732). The pressure which rises further now opens the non-return valve (734) at port (B1). Volume flow now flows via port (B1) into the hydraulic cylinders which now extend. The oil displaced from the hydraulic cylinders in this process flows back to the tank via pressure relief valve (705).

**Note:** The hydraulically narrowest concave position cannot be used in operation since the bottom valves open at the end stop of the hydraulic cylinders.

A compensation is obtained between the piston and the piston rod side of the hydraulic cylinder, making the concave fall back a little in this position until the bottom valves close again.

**Concave Adjustment - LEXION 560 - 510****Hydraulic Overload System without Filling Valve**

Pressure relief valve, hydraulic cylinder with purge valves - LEXION 560 – 510



**Key to diagram:**

309	Concave adjustment left hydraulic cylinder
310	Concave adjustment right hydraulic cylinder
705	Concave adjustment pressure relief valve ..... 90±5 bar
A1	Solenoid valve connection Concave adjustment narrow (close)
B	Solenoid valve connection Concave adjustment wide (open)
V	Bottom valves
II	Working hydraulics valve block LEXION 560-510

**Description of function:****Pressure limitation**

The entire load in the threshing mechanism is applied to the pressure relief valve (706) (hydraulically via the oil column of the hydraulic cylinders). At an overload of approx. 2.5 t on the concave, the pressure relief valve (705) set to 90±5 bar opens and relieves the system to the tank.

The concave thus opens automatically and goes back to the pre-set position automatically due to the electronic control after the pressure drops.

**Pressure setting**

The spring in the pressure relief valve (706) is pre-stressed for a load pressure of **90±5 bar**. The pressure setting may be modified by removing or adding shims.

**The 0.5 mm shim corresponds to approx. 7 bar**  
**The 1.2 mm shim corresponds to approx. 17 bar**

**Note:** The above values refer to a rated pressure of 180 bar and may deviate, depending on the actual system. Each time the setting has been modified, the system pressure must be checked.

**Synchronism function of cylinders**

These hydraulic cylinders are designed so that the face end of the left cylinder (309) corresponds to the piston rod side of the right cylinder (310). The cylinders therefore are synchronous, making the connecting rods retract and extend in parallel, independent of their load.

**Bottom valves**

The bottom valves (V) open every time an end position is reached so that air inclusions in the connection between the two cylinders can be flushed out.

After a repair, the cylinders must be flushed in both end positions for approx. 15 sec.

**Note:** The hydraulic cylinders are flushed automatically after every 24 hours when switching the threshing mechanism on and set to the pre-set concave position after this process.



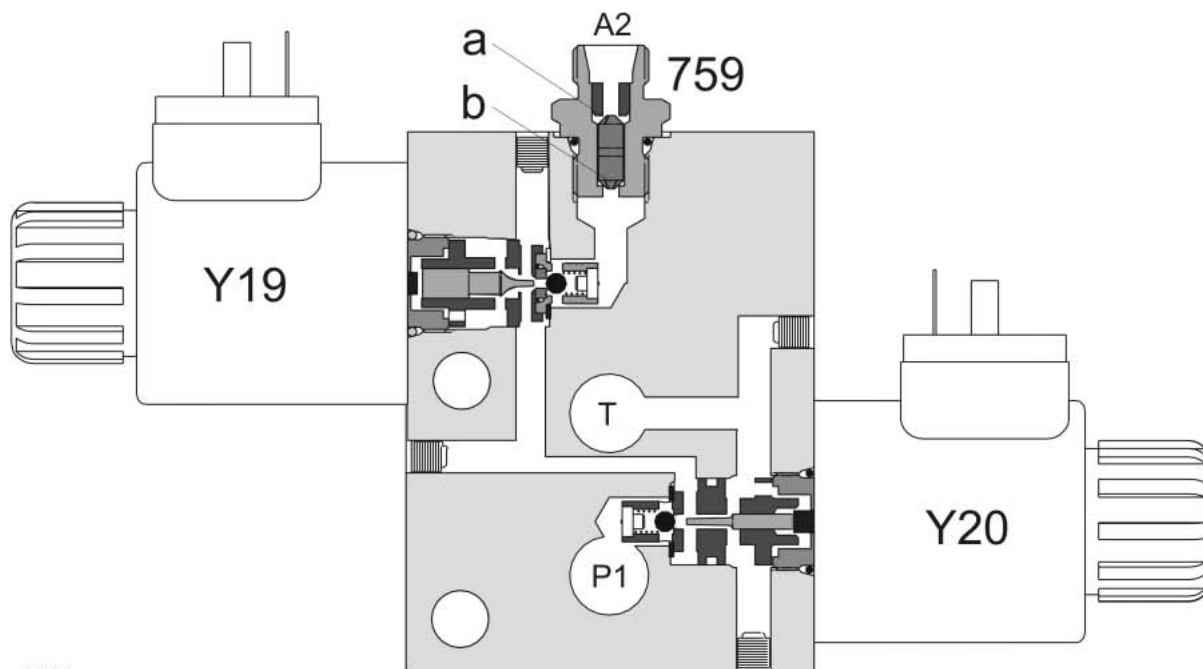
## 3.4

### Threshing Drum Speed Control

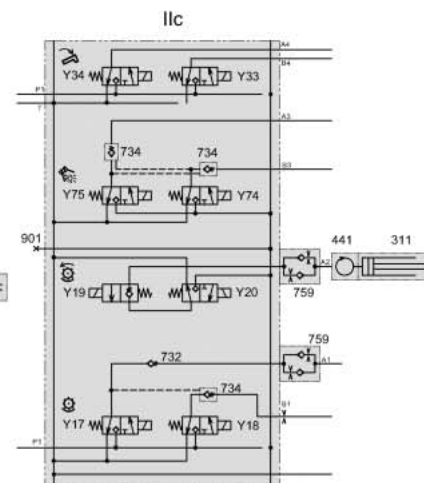
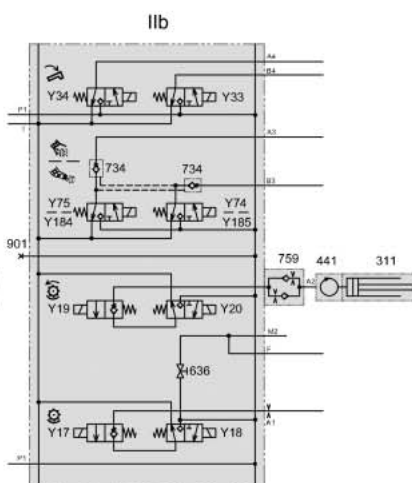
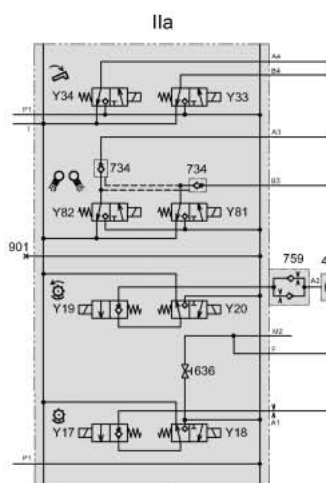
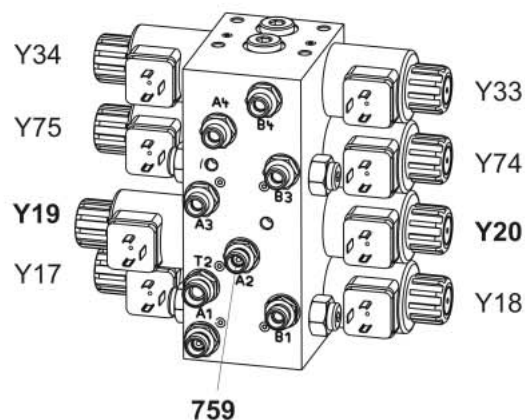
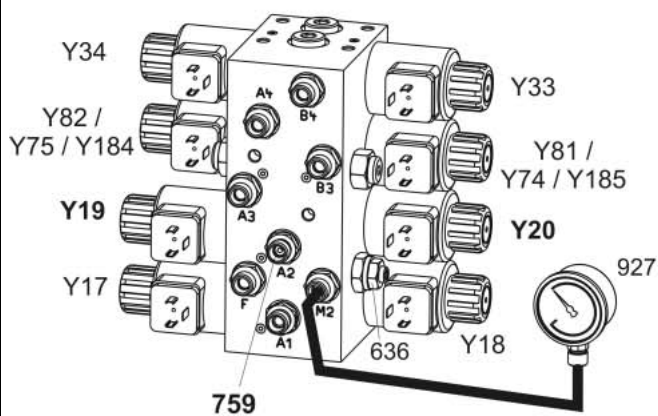
3.4.1	<b>Threshing Drum Speed Control .....</b>	<b>3-54</b>
	3/3 way solenoid valve with lock-up valve unit .....	3-54
	Hydraulic cylinder with rotary coupling .....	3-56

**3.4.1 Threshing Drum Speed Control**

3/3 way solenoid valve with lock-up valve unit



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400325-1



**Key to diagram:**

311	Threshing drum variable-speed drive hydraulic cylinder
441	Rotary coupling
759	One-way restrictor valve, two-sided
Y17	Concave narrow solenoid valve
Y18	Concave wide solenoid valve
Y19	Threshing drum variable-speed drive slow solenoid valve
Y20	Threshing drum variable-speed drive fast solenoid valve
Y33	Grain tank unloading tube swing out solenoid valve
Y34	Grain tank unloading tube swing in solenoid valve
Y74	Straw chopper in working position solenoid valve
Y75	Straw chopper in swathing mode solenoid valve
Y81	Uni-spreader fan in working position solenoid valve
Y82	Uni-spreader fan in transport position solenoid valve
Y184	Radial spreader swathing position
Y185	Radial spreader working/transport position
T	Tank port
P1	Pump via master valve port
A2	Uni-spreader port
A5	Speed adjustment hydraulic cylinder port
a	One-way restrictor valve - 1 notch
b	One-way restrictor valve -2 notches
IIa	Working hydraulics valve block LEXION 580
IIb	Working hydraulics valve block LEXION 570
IIc	Working hydraulics valve block LEXION 560-510

**Description of function:****Neutral function**

The threshing drum variable-speed drive hydraulic cylinder (311) is tightly closed by the ball seat in the valve insert of the threshing drum slow solenoid valve (Y19).

**Increase speed function**

The threshing drum fast solenoid valve (Y20) and the master valve are actuated at the same time. The corresponding pilot spool opens the ball in the valve insert and closes the return line to the tank. The pressure thus rising opens the ball in the valve insert of the unactuated threshing drum slow solenoid valve (Y19). The oil flows to consumer port A2 via the notch (a) in the one-way restrictor valve (759).

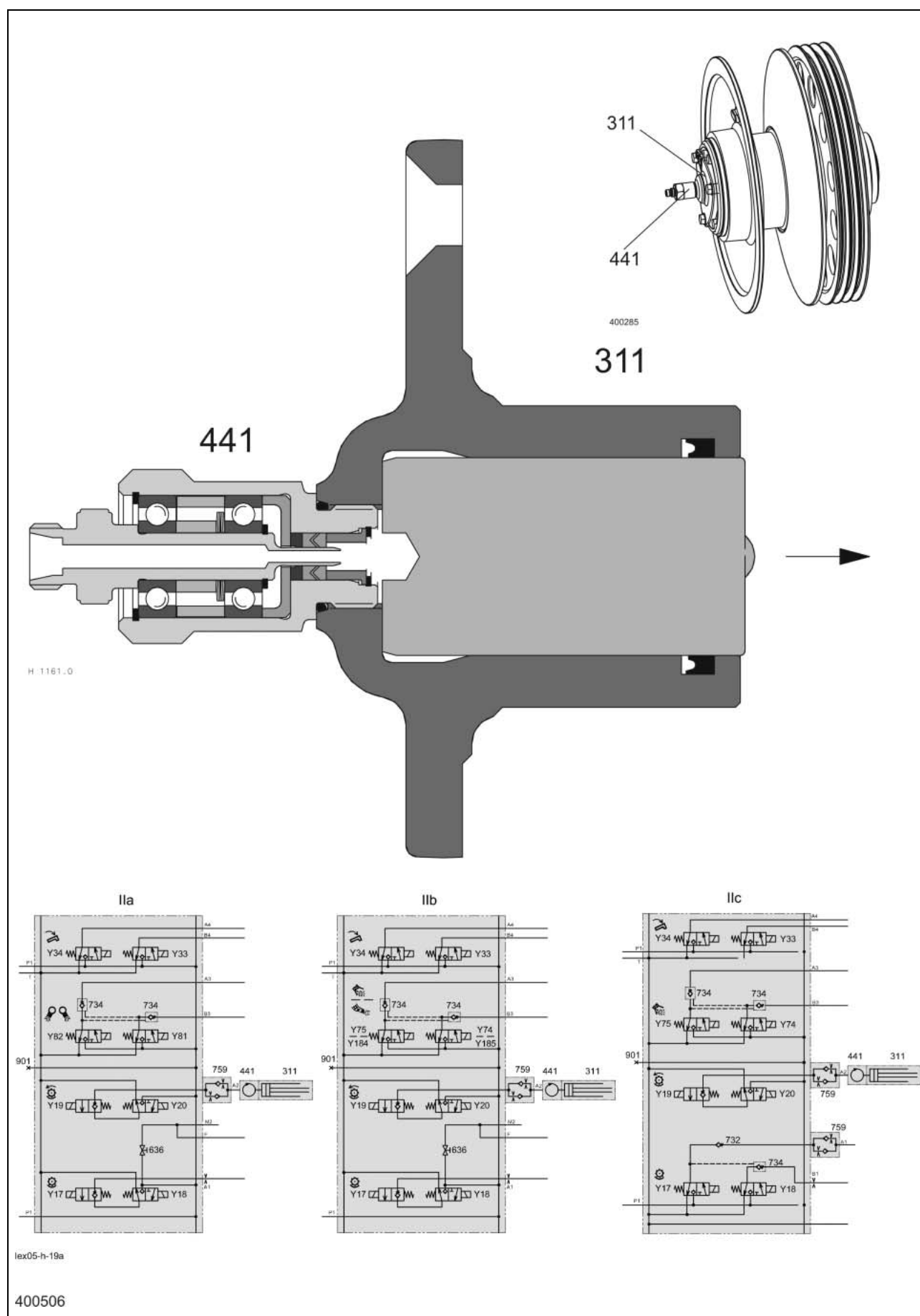
**Reduce speed function**

Solenoid valve (Y19) is actuated without the master valve. The pilot spool in question opens the ball in the valve insert and thus relieves the oil pressure via notches (b) of the one-way restrictor valve (597) and the valve insert of the unactuated threshing drum fast solenoid valve (Y20) to the tank.

**Note:** To ensure even control function in both directions, volume flow flows via notches (b) in the one-way restrictor valve (759) when adjusting the variator.

**Threshing Drum Speed Control**

Hydraulic cylinder with rotary coupling



**Key to diagram:**

311	Threshing drum variable-speed drive hydraulic cylinder
441	Rotary coupling
636	Concave overload system shut-off valve
732	Non-return valve
734	Lock-up valve unit (non-return valve)
759	One-way restrictor valve, two-sided
Y17	Concave narrow solenoid valve
Y18	Concave wide solenoid valve
Y19	Threshing drum variable-speed drive slow solenoid valve
Y20	Threshing drum variable-speed drive fast solenoid valve
Y33	Grain tank unloading tube swing out solenoid valve
Y34	Grain tank unloading tube swing in solenoid valve
Y74	Straw chopper in working position solenoid valve
Y75	Straw chopper in swathing mode solenoid valve
Y81	Uni-spreader fan in working position solenoid valve
Y82	Uni-spreader fan in transport position solenoid valve
Y184	Radial spreader swathing position
Y185	Radial spreader working/transport position
A	Speed adjustment solenoid valve port
N	Seal
Ila	Working hydraulics valve block LEXION 580
Ilb	Working hydraulics valve block LEXION 570
Ilc	Working hydraulics valve block LEXION 560-510

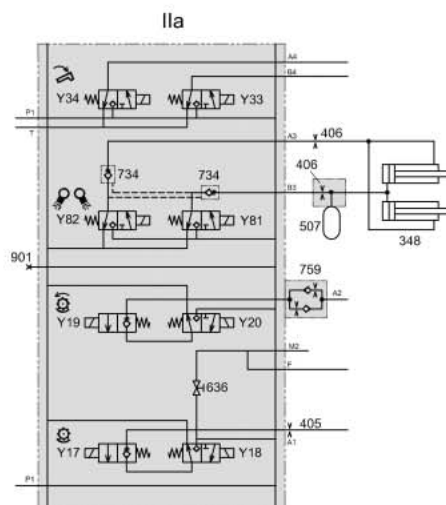
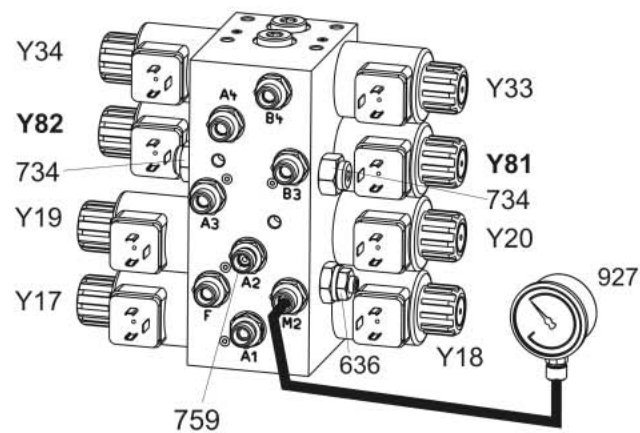
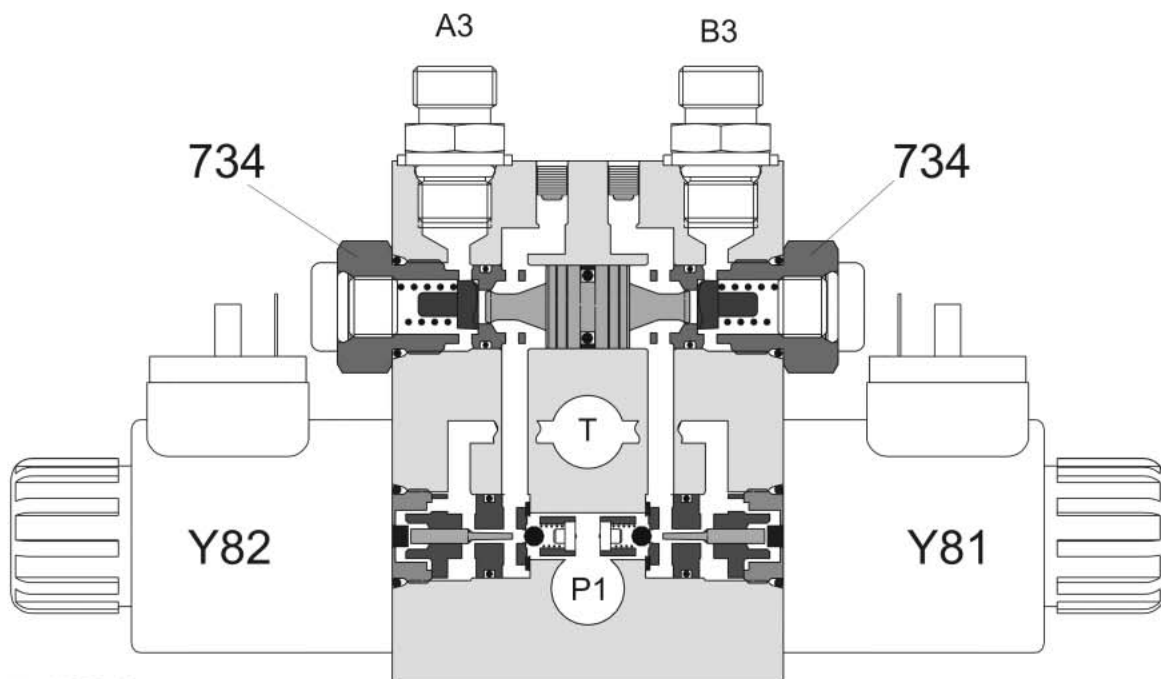


**3.5****Uni-spreader /  
Radial spreader /  
Swing Swathing  
Flap**

<b>3.5.1</b>	<b>Swing Uni-spreader .....</b>	<b>3-60</b>
	4/3 way solenoid valve with lock-up valve unit .....	3-60
	Hydraulic cylinders .....	3-62
<b>3.5.2</b>	<b>Swing Radial spreader .....</b>	<b>3-64</b>
	4/3 way solenoid valve with lock-up valve unit .....	3-64
	Hydraulic cylinders .....	3-66
<b>3.5.3</b>	<b>Swing Swathing Flap.....</b>	<b>3-68</b>
	4/3 way solenoid valve with lock-up valve unit .....	3-68
	Hydraulic cylinders .....	3-70

**3.5.1 Swing Uni-spreader**

4/3 way solenoid valve with lock-up valve unit



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lex05-h-76a

**Key to diagram:**

348	Uni-spreader / Straw chopper position hydraulic cylinder
378	Swathing flap position hydraulic cylinder
405	Orifice plate E .....Ø 0.6 mm
406	Orifice plate F .....Ø 0.8 mm
507	Uni-spreader / Swathing flap position accumulator .....0.075 l / 60 bar
636	Concave overload system shut-off valve
734	Non-return valve (Lock-up valve unit)
759	One-way restrictor valve, two-sided
927	Concave overload system pressure gauge
Y17	Concave narrow solenoid valve
Y18	Concave wide solenoid valve
Y19	Threshing drum variable-speed drive slow solenoid valve
Y20	Threshing drum variable-speed drive fast solenoid valve
Y33	Grain tank unloading tube swing out solenoid valve
Y34	Grain tank unloading tube swing in solenoid valve
Y81	Uni-spreader in working position solenoid valve
Y82	Uni-spreader in transport position solenoid valve
IIa	Working hydraulics valve block LEXION 580
T	Tank port
P1	Pump via master valve port
A2	Uni-spreader / Straw chopper in rest position hydraulic cylinder port
A3	Uni-spreader / Straw chopper position hydraulic cylinder port
B2	Uni-spreader / Straw chopper in working position hydraulic cylinder port
B3	Uni-spreader / Straw chopper position hydraulic cylinder port
K	Piston

**Description of function:**

## Neutral function

Both sides of the hydraulic cylinder (348) are blocked tightly by the non-return valves (734) in the consumer ports A3 and B3.

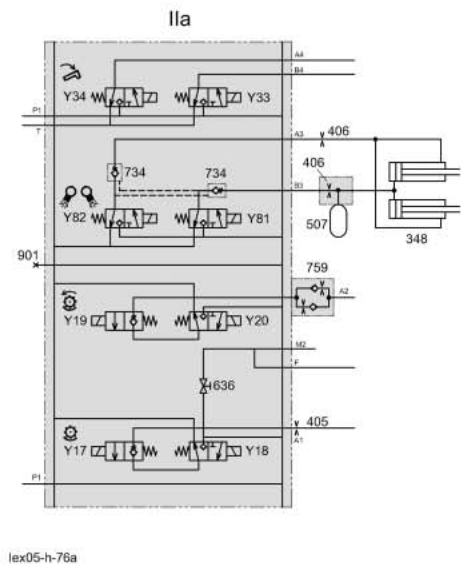
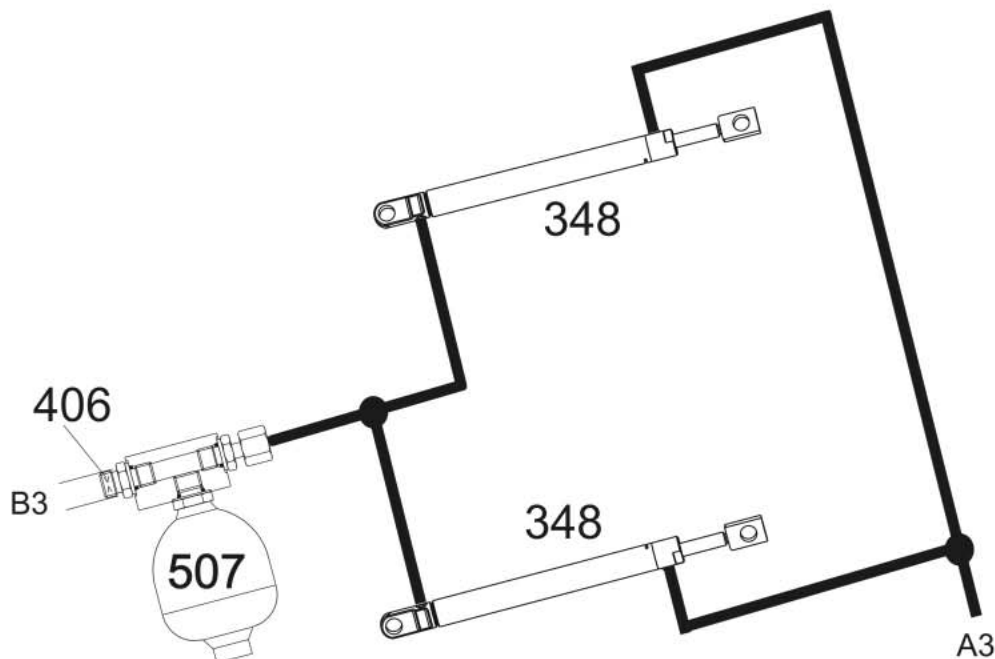
## Description of function

Depending on the necessary direction of movement, one of the solenoid valves (Y81/Y82) and, at the same time, the master valve (Y77) is actuated. The corresponding pilot spool opens the ball in the valve insert and closes the return line to the tank. The pressure which consequently rises builds up against the piston and opens the non-return valve (734) at port A or B.

The pressure rising further now opens the non-return valve (734) at the opposite port and the hydraulic cylinders are retracted or extended.

The return line of the hydraulic cylinder is connected to the tank via the valve insert of the unactuated solenoid valve (Y81/Y82).

Swing Uni-spreader  
Hydraulic cylinders



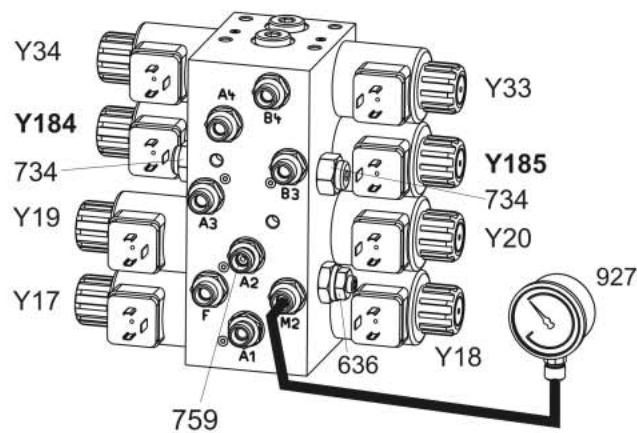
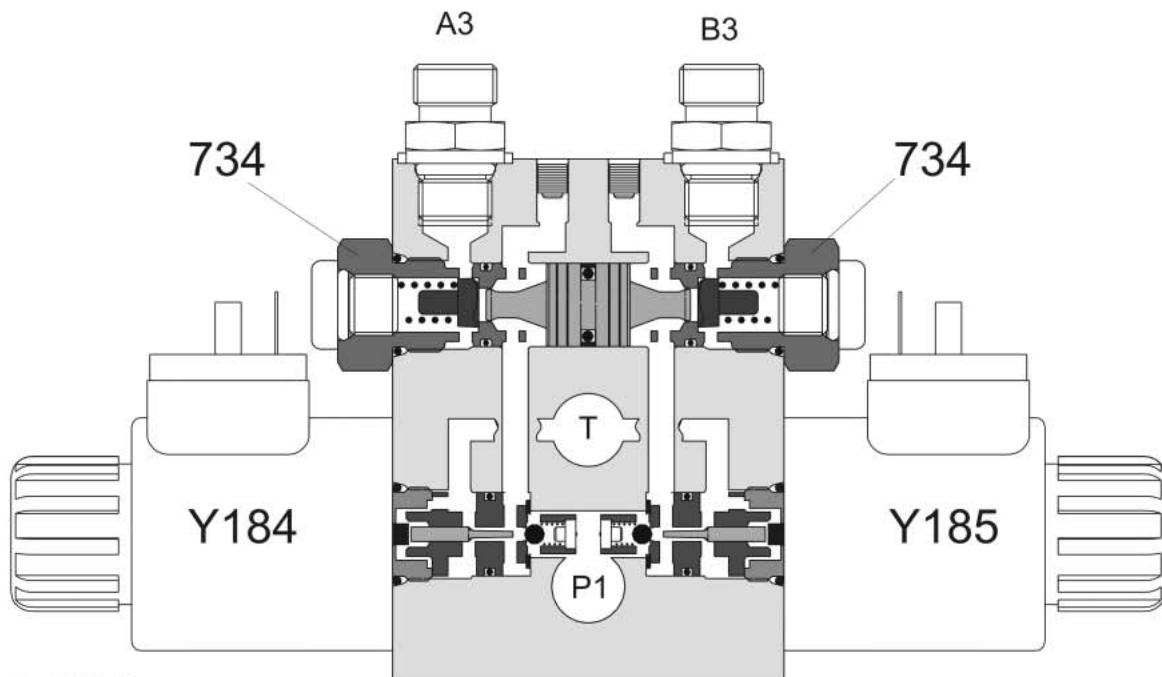


**Key to diagram:**

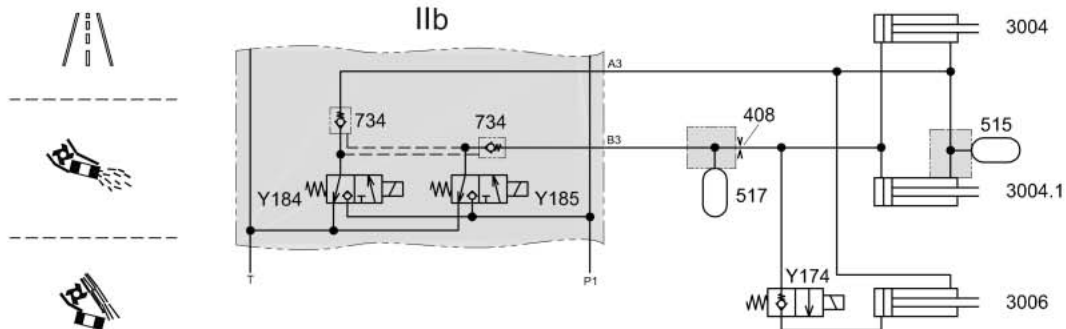
348	Uni-spreader / Straw chopper position hydraulic cylinder
378	Swathing flap position hydraulic cylinder
405	Orifice plate E .....Ø 0.6 mm
406	Orifice plate F .....Ø 0.8 mm
507	Uni-spreader / Swathing flap position accumulator .....0.075 l / 60 bar
734	Non-return valve (Lock-up valve unit)
759	One-way restrictor valve, two-sided
Y17	Concave narrow solenoid valve
Y18	Concave wide solenoid valve
Y19	Threshing drum variable-speed drive slow solenoid valve
Y20	Threshing drum variable-speed drive fast solenoid valve
Y33	Grain tank unloading tube swing out solenoid valve
Y34	Grain tank unloading tube swing in solenoid valve
Y81	Uni-spreader in working position solenoid valve
Y82	Uni-spreader in transport position solenoid valve
IIa	Working hydraulics valve block LEXION 580
T	Tank port
P1	Pump via master valve port
A2	Uni-spreader / Straw chopper in rest position hydraulic cylinder port
A3	Uni-spreader / Straw chopper position hydraulic cylinder port
B2	Uni-spreader / Straw chopper in working position hydraulic cylinder port
B3	Uni-spreader / Straw chopper position hydraulic cylinder port
K	Piston

**3.5.2 Swing Radial spreader**

4/3 way solenoid valve with lock-up valve unit



a)



**Key to diagram:**

3004	Radial spreader working/swathing position
3006	Radial spreader transport position
408	Orifice plate H ..... 1.2 mm
515	Accumulator ..... 0.075 l / 60 bar
517	Accumulator working position ..... 0.075 l / 60 bar
636	Concave overload system shut-off valve
734	Non-return valve (Lock-up valve unit)
759	One-way restrictor valve, two-sided
927	Concave overload system pressure gauge
Y17	Concave narrow solenoid valve
Y18	Concave wide solenoid valve
Y19	Threshing drum variable-speed drive slow solenoid valve
Y20	Threshing drum variable-speed drive fast solenoid valve
Y33	Grain tank unloading tube swing out solenoid valve
Y34	Grain tank unloading tube swing in solenoid valve
Y174	Radial spreader transport position
Y184	Radial spreader swathing position
Y185	Radial spreader working/transport position
IIb	Working hydraulics valve block LEXION 570
T	Tank port
P1	Pump via master valve port
A3	Hydraulic cylinder port Radial spreader in swathing position
B3	Hydraulic cylinder port Radial spreader in working/transport position

**Description of function:****Swathing position**

When the radial spreader is in transport position, energizing the radial spreader swathing position solenoid valve (Y184) first retracts the radial spreader transport position hydraulic cylinder (3006) and then the radial spreader working/swathing position hydraulic cylinders (3004).

**Working position**

Energizing the radial spreader working/transport position solenoid valve (Y185) extends the radial spreader working/swathing position hydraulic cylinders (3004).

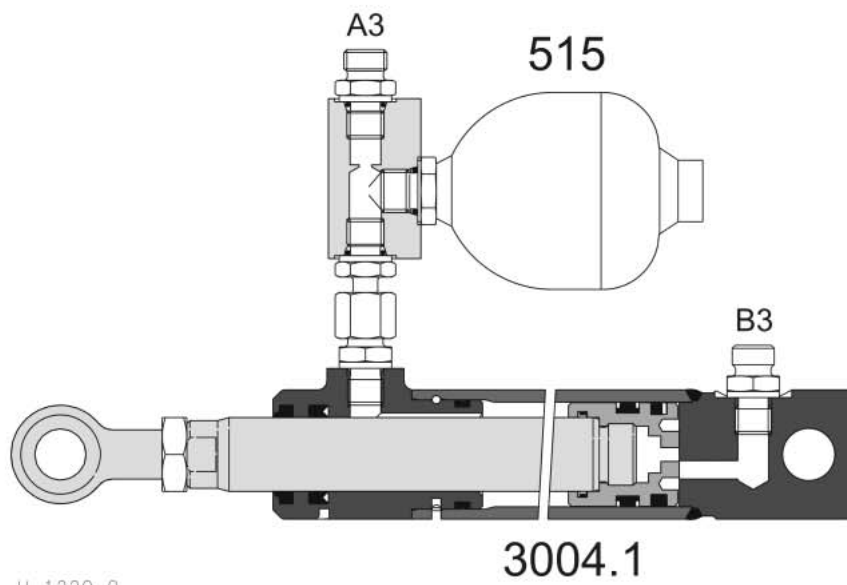
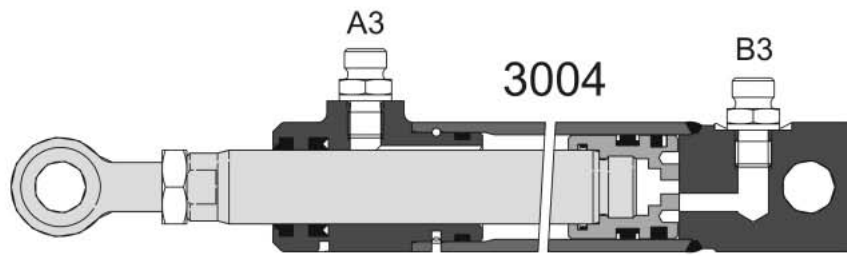
Note: When pressing the straw chopper in working position switch (U13), the radial spreader changes from the working to the swathing position and vice versa – toggle function (see also electric circuit diagram no. 19).

**Transport position**

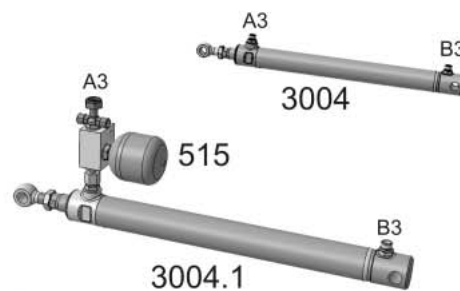
By energizing the radial spreader working/transport position (Y185) and radial spreader transport position (Y174) solenoid valves, the radial spreader is moved to transport position.

# Swing Radial spreader

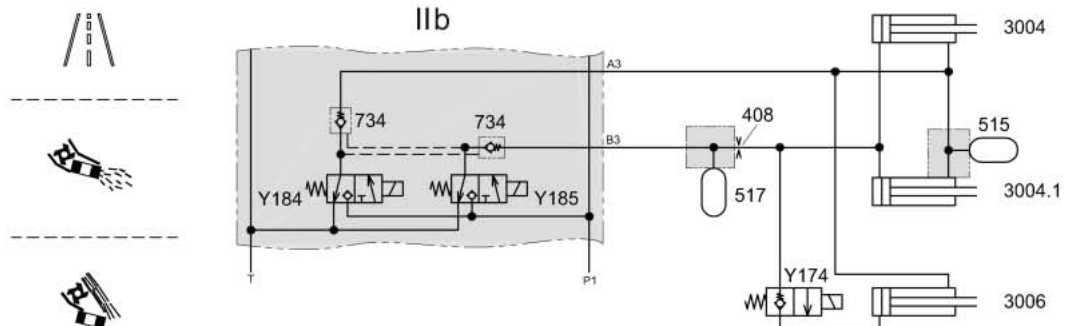
## Hydraulic cylinders



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a)



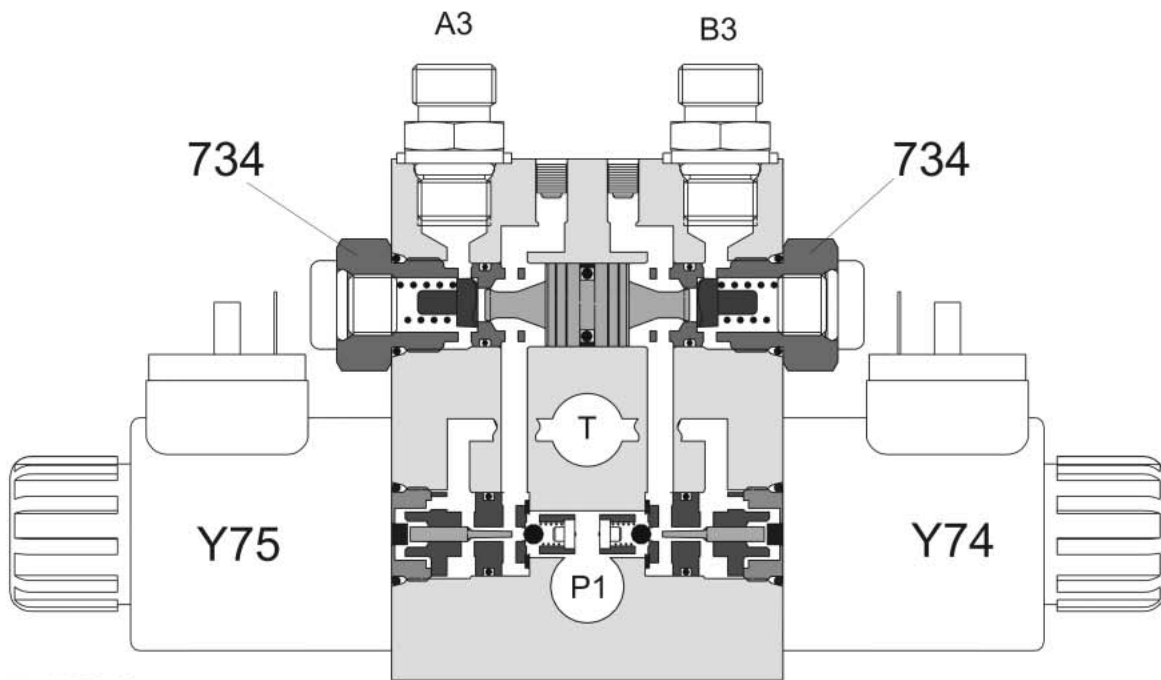
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**Key to diagram:**

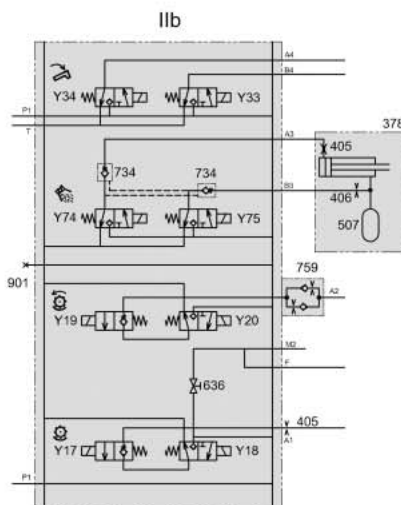
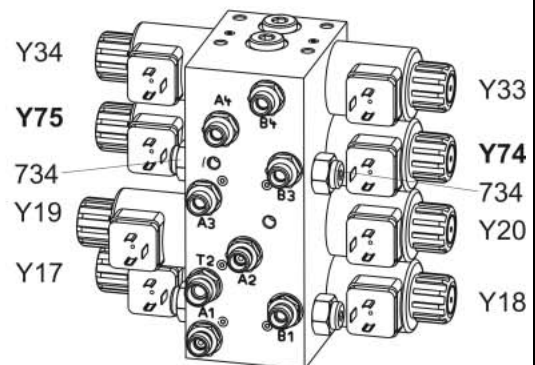
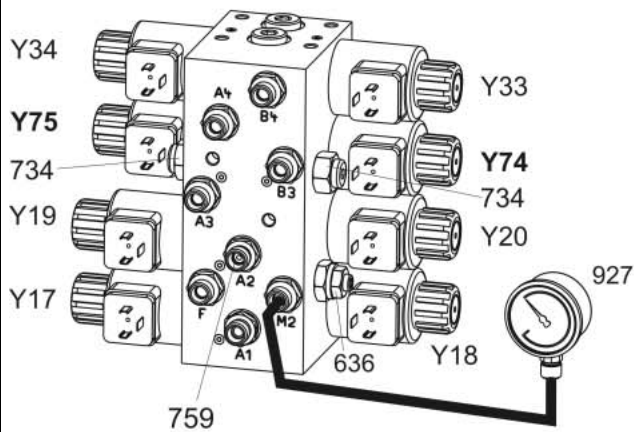
3004	Radial spreader working/swathing position
3006	Radial spreader transport position
408	Orifice plate H ..... 1.2 mm
515	Accumulator ..... 0.075 l / 60 bar
517	Accumulator working position ..... 0.075 l / 60 bar
734	Non-return valve (Lock-up valve unit)
Y174	Radial spreader transport position
Y184	Radial spreader swathing position
Y185	Radial spreader working/transport position
IIb	Working hydraulics valve block LEXION 570
T	Tank port
P1	Pump via master valve port
A3	Hydraulic cylinder port Radial spreader in swathing position
B3	Hydraulic cylinder port Radial spreader in working/transport position

**3.5.3 Swing Swathing Flap**

4/3 way solenoid valve with lock-up valve unit

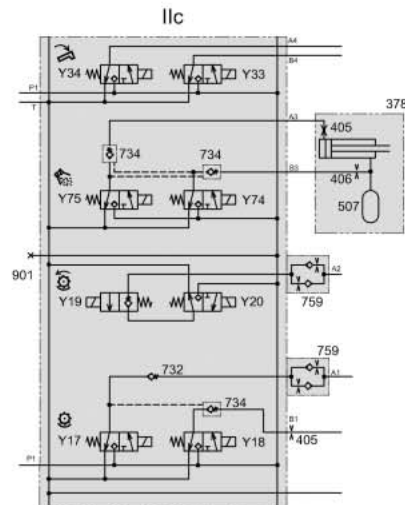


H 1175.0



401273

lex05-h-77a



lex05-h-78a

**Key to diagram:**

348	Uni-spreader / Straw chopper position hydraulic cylinder
378	Swathing flap position hydraulic cylinder
405	Orifice plate E .....Ø 0.6 mm
406	Orifice plate F .....Ø 0.8 mm
507	Uni-spreader / Swathing flap position accumulator .....0.075 l / 60 bar
636	Concave overload system shut-off valve
734	Non-return valve (Lock-up valve unit)
759	One-way restrictor valve, two-sided
927	Concave overload system pressure gauge
Y17	Concave narrow solenoid valve
Y18	Concave wide solenoid valve
Y19	Threshing drum variable-speed drive slow solenoid valve
Y20	Threshing drum variable-speed drive fast solenoid valve
Y33	Grain tank unloading tube swing out solenoid valve
Y34	Grain tank unloading tube swing in solenoid valve
Y74	Straw chopper in working position solenoid valve
Y75	Straw chopper in transport position solenoid valve
Ilb	Working hydraulics valve block LEXION 570
Ilc	Working hydraulics valve block LEXION 560 - 510
T	Tank port
P1	Pump via master valve port
A2	Uni-spreader / Straw chopper in rest position hydraulic cylinder port
A3	Uni-spreader / Straw chopper position hydraulic cylinder port
B2	Uni-spreader / Straw chopper in working position hydraulic cylinder port
B3	Uni-spreader / Straw chopper position hydraulic cylinder port
K	Piston

**Description of function:**

## Neutral function

Both sides of the hydraulic cylinder (348) are blocked tightly by the non-return valves (734) in the consumer ports A3 and B3.

## Description of function

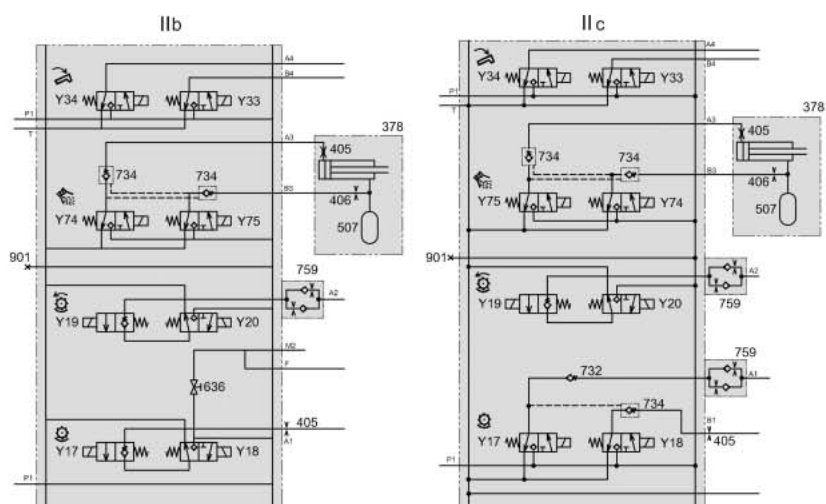
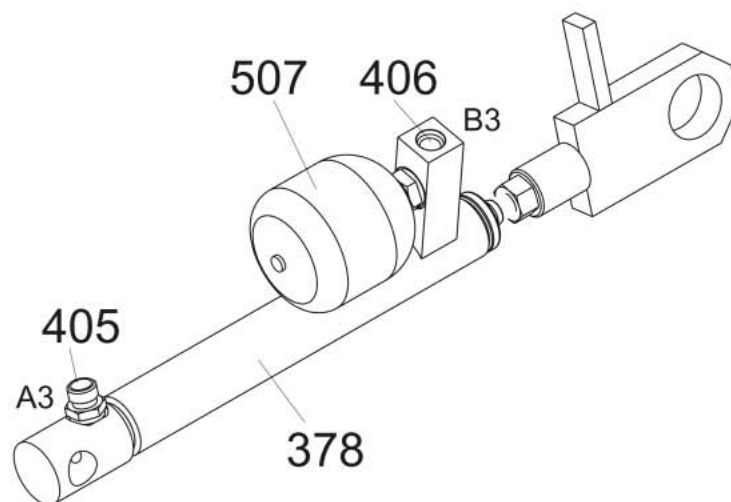
Depending on the necessary direction of movement, one of the solenoid valves (Y74/Y75) and, at the same time, the master valve (Y77) is actuated. The corresponding pilot spool opens the ball in the valve insert and closes the return line to the tank. The pressure which consequently rises builds up against the piston and opens the non-return valve (734) at port A or B.

The pressure rising further now opens the non-return valve (734) at the opposite port and the hydraulic cylinders are retracted or extended.

The return line of the hydraulic cylinder is connected to the tank via the valve insert of the unactuated solenoid valve (Y74/Y75).

# Swing Swathing Flap

## Hydraulic cylinders



401274



**Key to diagram:**

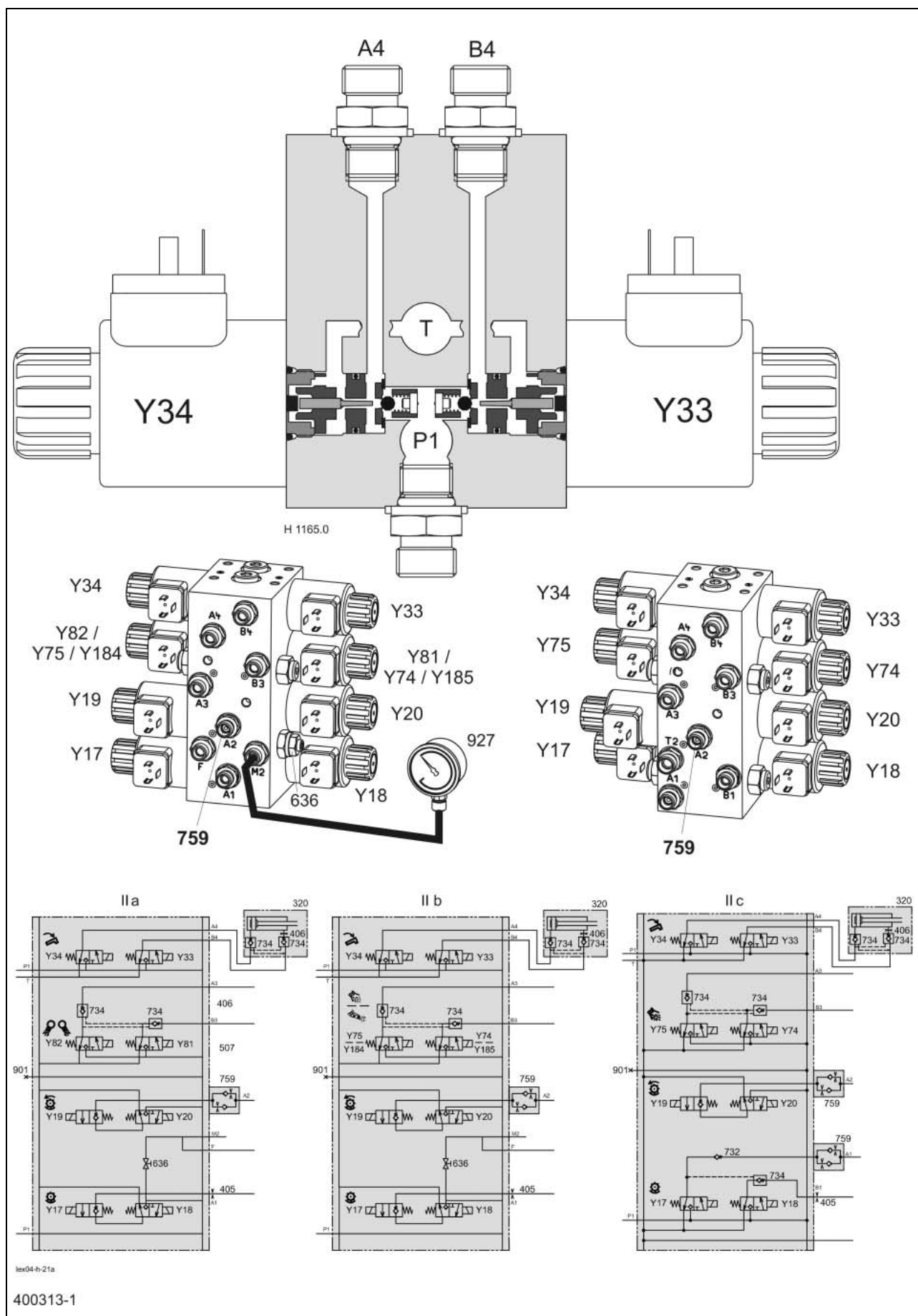
348	Uni-spreader / Straw chopper position hydraulic cylinder
378	Swathing flap position hydraulic cylinder
405	Orifice plate E .....Ø 0.6 mm
406	Orifice plate F .....Ø 0.8 mm
507	Uni-spreader / Swathing flap position accumulator .....0.075 l / 60 bar
734	Non-return valve (Lock-up valve unit)
759	One-way restrictor valve, two-sided
Y17	Concave narrow solenoid valve
Y18	Concave wide solenoid valve
Y19	Threshing drum variable-speed drive slow solenoid valve
Y20	Threshing drum variable-speed drive fast solenoid valve
Y33	Grain tank unloading tube swing out solenoid valve
Y34	Grain tank unloading tube swing in solenoid valve
Y74	Straw chopper in working position solenoid valve
Y75	Straw chopper in transport position solenoid valve
IIb	Working hydraulics valve block LEXION 570
IIc	Working hydraulics valve block LEXION 560 - 510
T	Tank port
P1	Pump via master valve port
A2	Uni-spreader / Straw chopper in rest position hydraulic cylinder port
A3	Uni-spreader / Straw chopper position hydraulic cylinder port
B2	Uni-spreader / Straw chopper in working position hydraulic cylinder port
B3	Uni-spreader / Straw chopper position hydraulic cylinder port
K	Piston



**3.6****Swing Grain Tank  
Unloading Tube**

<b>3.6.1</b>	<b>Swing Grain Tank Unloading Tube .....</b>	<b>3-74</b>
	4/3 way solenoid valve .....	3-74
	Hydraulic cylinder with hydraulic cushion and lock-up valve unit.....	3-76

### 3.6.1 Swing Grain Tank Unloading Tube 4/3 way solenoid valve



**Key to diagram:**

320	Swing grain tank unloading tube hydraulic cylinder
405	Orifice plate E ..... Ø 0.6 mm
406	Orifice plate F ..... Ø 0.8 mm
636	Concave overload system shut-off valve
732	Non-return valve
734	Non-return valve (Lock-up valve unit)
759	One-way restrictor valve, two-sided
Y33	Grain tank unloading tube swing out solenoid valve
Y34	Grain tank unloading tube swing in solenoid valve
Y17	Concave narrow solenoid valve
Y18	Concave wide solenoid valve
Y19	Threshing drum variable-speed drive slow solenoid valve
Y20	Threshing drum variable-speed drive fast solenoid valve
Y74	Straw chopper in working position solenoid valve
Y75	Straw chopper in swathing mode solenoid valve
Y81	Uni-spreader in working position solenoid valve
Y82	Uni-spreader fan in transport position solenoid valve
Y184	Radial spreader swathing position
Y185	Radial spreader working/transport position
T	Tank port
P1	Pump via master valve port
A4	Grain tank unloading tube swing out hydraulic cylinder
B4	Grain tank unloading tube swing in hydraulic cylinder
IIa	Working hydraulics valve block LEXION 580
IIb	Working hydraulics valve block LEXION 570
IIc	Working hydraulics valve block LEXION 560 - 510

**Description of function:**

## Neutral function

Both sides of the hydraulic cylinder (320) are tightly closed by the non-return valves (734).

## Description of function

Depending on the necessary direction of movement, one of the solenoid valves (Y33/Y34) and, at the same time, the master valve (Y77) is actuated. The corresponding pilot spool opens the ball in the valve insert and closes the return line to the tank.

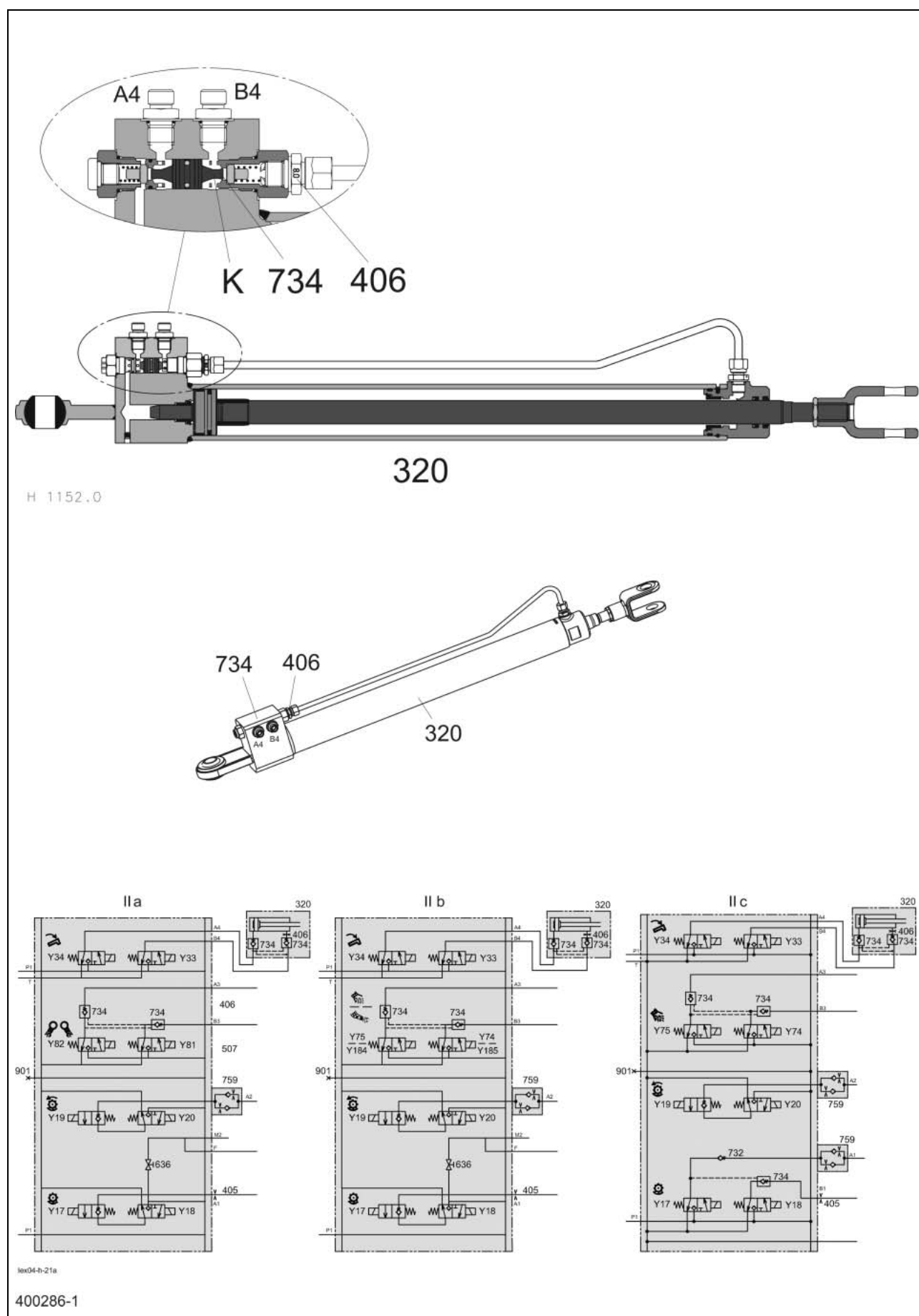
The pressure which consequently rises builds up against the piston in lock-up valve unit (734) of the swing grain tank unloading tube hydraulic cylinder (320) and in this process opens port A4 and/or B4.

The non-return valve (lock-up valve unit 734) is part of hydraulic cylinder (320).

The return line of the hydraulic cylinder is released to the tank via the valve insert of the unactuated solenoid valve (Y34/Y33). The pressure rising further now opens the non-return valve (lock-up valve unit 734) at the opposite port B4 and/or A4 and the hydraulic cylinder is retracted or extended.

**Swing Grain Tank Unloading Tube**

Hydraulic cylinder with hydraulic cushion and lock-up valve unit



**Key to diagram:**

320	Swing grain tank unloading tube hydraulic cylinder
405	Orifice plate E ..... Ø 0.6 mm
406	Orifice plate F ..... Ø 0.8 mm
636	Concave overload system shut-off valve
732	Non-return valve
734	Non-return valve (Lock-up valve unit)
759	One-way restrictor valve, two-sided
Y33	Grain tank unloading tube swing out solenoid valve
Y34	Grain tank unloading tube swing in solenoid valve
Y17	Concave narrow solenoid valve
Y18	Concave wide solenoid valve
Y19	Threshing drum variable-speed drive slow solenoid valve
Y20	Threshing drum variable-speed drive fast solenoid valve
Y74	Straw chopper in working position solenoid valve
Y75	Straw chopper in swathing mode solenoid valve
Y81	Uni-spreader in working position solenoid valve
Y82	Uni-spreader fan in transport position solenoid valve
Y184	Radial spreader swathing position
Y185	Radial spreader working/transport position
T	Tank port
P1	Pump via master valve port
A4	Grain tank unloading tube swing out hydraulic cylinder
B4	Grain tank unloading tube swing in hydraulic cylinder
IIa	Working hydraulics valve block LEXION 580
IIb	Working hydraulics valve block LEXION 570
IIc	Working hydraulics valve block LEXION 560 - 510

**Description of function:****Safety valve**

The non-return valve (lock-up valve unit) serves as a safety valve which is to keep the grain tank unloading tube from swinging out automatically when a line breaks.

**Hydraulic cushion**

The cylinder movement is slowed down before an end position is reached. This is achieved by the peg (when retracting) or the bigger diameter of the piston rod (when extending) considerably reducing the cross-section of the return line.





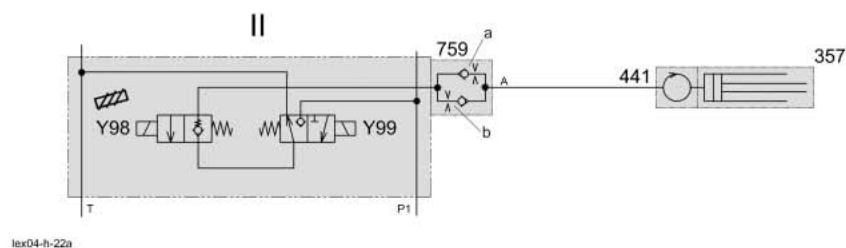
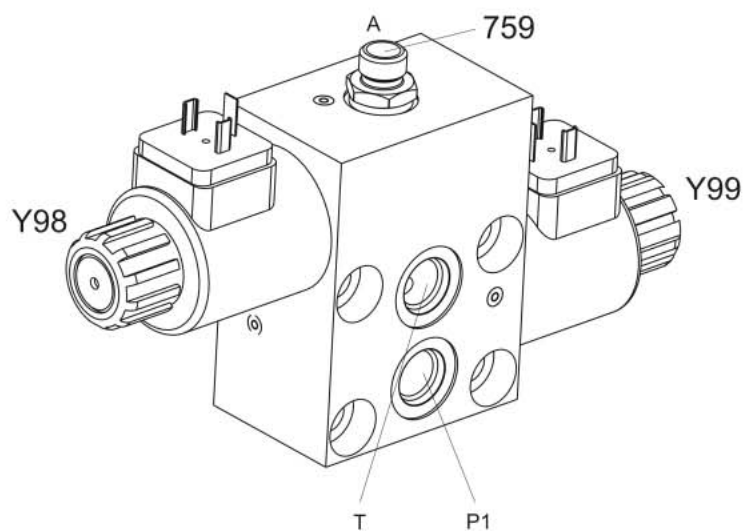
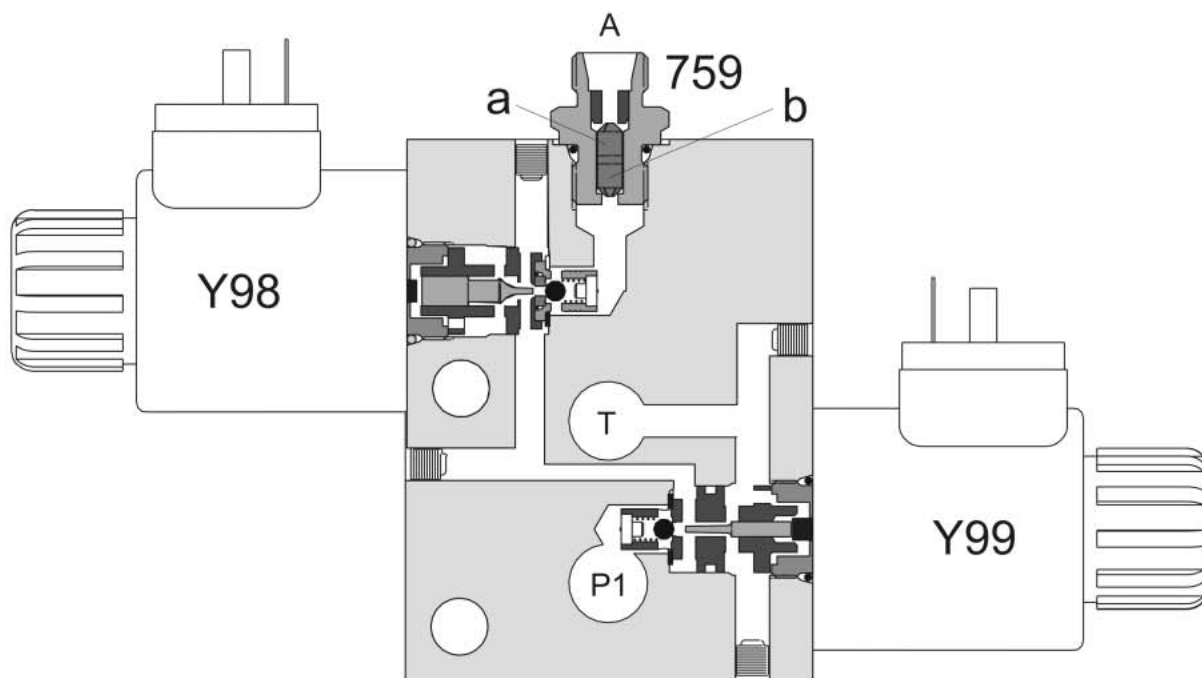
## 3.7

### Rotor Speed Control

<b>3.7.1</b>	<b>Rotor Speed Control .....</b>	<b>3-80</b>
	3/3 way solenoid valve .....	3-80
	Hydraulic cylinder with rotary coupling .....	3-82

### 3.7.1 Rotor Speed Control

3/3 way solenoid valve



400311

**Key to diagram:**

357	Rotor variable-speed drive hydraulic cylinder
441	Rotary coupling
759	One-way restrictor valve, two-sided
Y98	Rotor variable-speed drive slow solenoid valve
Y99	Rotor variable-speed drive fast solenoid valve
T	Tank port
P1	Pump via master valve port
A	Speed adjustment hydraulic cylinder port
a	One-way restrictor valve - 1 notch
b	One-way restrictor valve - 2 notches

**Description of function:**

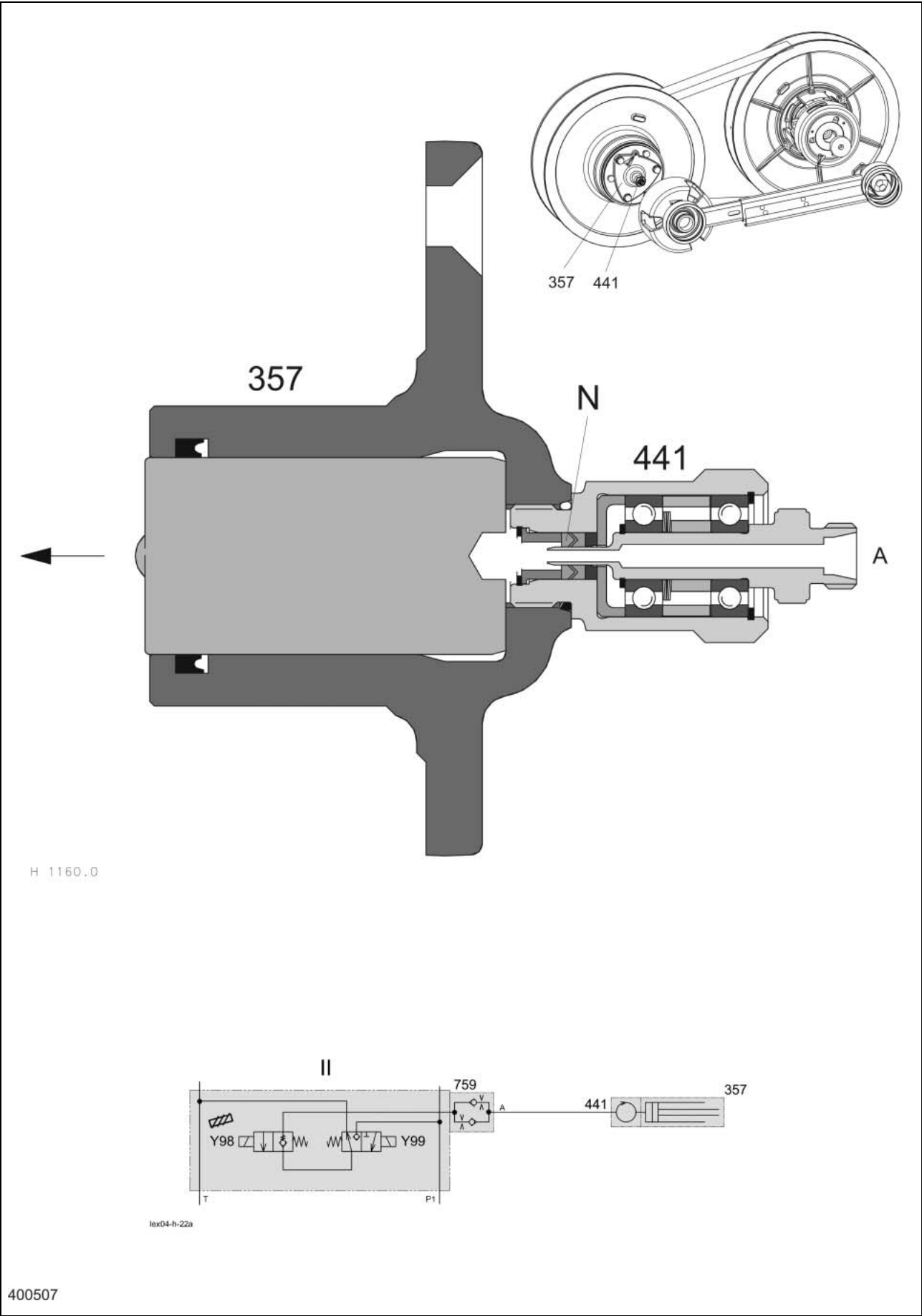
**Neutral function** Hydraulic cylinder (357) is tightly closed by the ball seat in the valve insert at consumer port A.

**Increase speed function** The solenoid valve (Y20) and the master valve (Y77) are actuated at the same time. The corresponding pilot spool opens the ball in the valve insert and closes the return line to the tank. The pressure (P1) thus rising opens the ball in the valve insert of the unactuated solenoid valve (Y98). The volume flow flows to consumer port A via the notch (a) in the one-way restrictor valve (759).

**Reduce speed function** Solenoid valve (Y98) is actuated without the master valve. The pilot spool in question opens the ball in the valve insert and thus relieves the oil pressure via notches (b) of the one-way restrictor valve (759) and the valve insert of the unactuated solenoid valve (Y99) to the tank.

**Note:** To ensure even control function in both directions, the oil flow is directed through two notches (b) in the one-way restrictor valve by the variator spring force when relieving the pressure of the variator.

**Rotor Speed Control**  
Hydraulic cylinder with rotary coupling



**Key to diagram:**

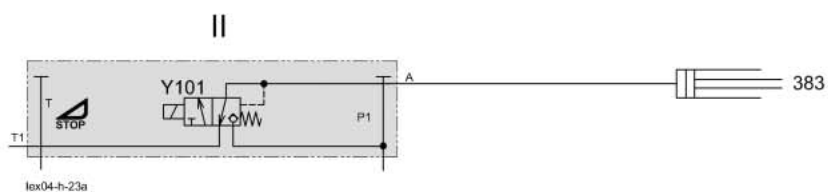
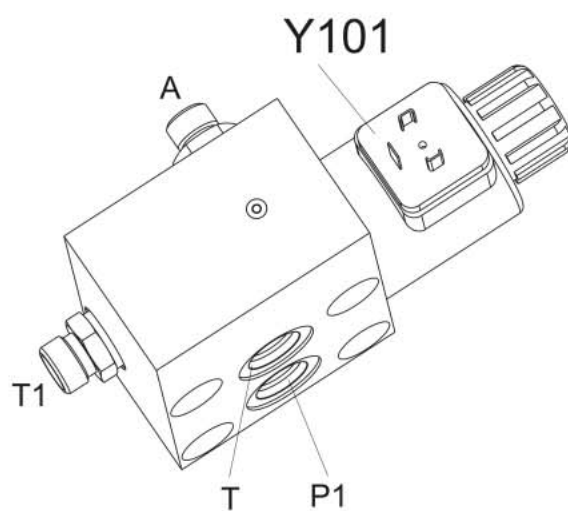
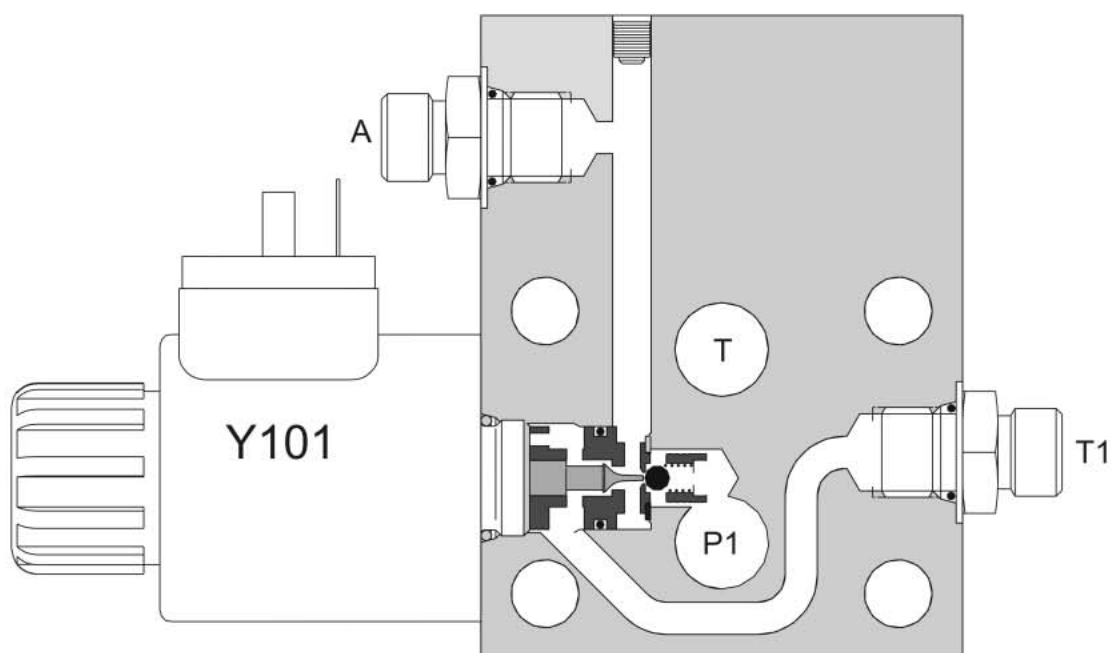
357	Rotor variable-speed drive hydraulic cylinder
441	Rotary coupling
759	One-way restrictor valve, two-sided
Y98	Rotor variable-speed drive slow solenoid valve
Y99	Rotor variable-speed drive fast solenoid valve
A	Speed adjustment solenoid valve port
N	Seal



**3.8****Front Attachment  
Quick Stop**

<b>3.8.1</b>	<b>Front Attachment Quick Stop.....</b>	<b>3-86</b>
	3/2 way solenoid valve .....	3-86
	Hydraulic cylinder (brake caliper) .....	3-88

### 3.8.1 Front Attachment Quick Stop 3/2 way solenoid valve



400310



**Key to diagram:**

383	Front attachment quick stop hydraulic cylinder
Y101	Front attachment quick stop solenoid coil
T	Tank port
P1	Pump via master valve port
A	Front attachment quick stop hydraulic cylinder port
II	Working hydraulics valve block

**Description of function:**

## Front attachment quick stop function

When the quick stop function is released on the multi-function handle (S54 – second stage) or on the front attachment ON/OFF switch (S95 - operating panel), the solenoid valve (Y101) and the master valve (Y77) are actuated at the same time.

The corresponding pilot spool opens the ball in the valve insert and closes the return line to the tank. The connection from P1 to the consumer port (A) is established. The hydraulic cylinder (383) (brake piston) extends and decelerates the front attachment drive via the brake disc.

## Pressure limitation

Since very high forces may act on the brake piston during the quick stop function, it is necessary to limit the pressure in port (A) to **approx. 120 bar**.

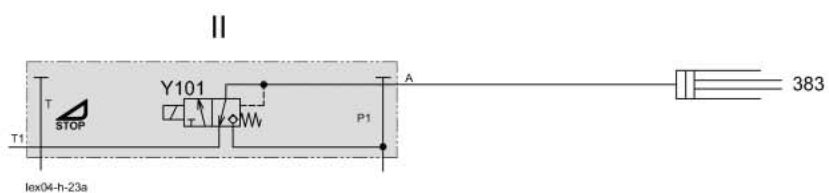
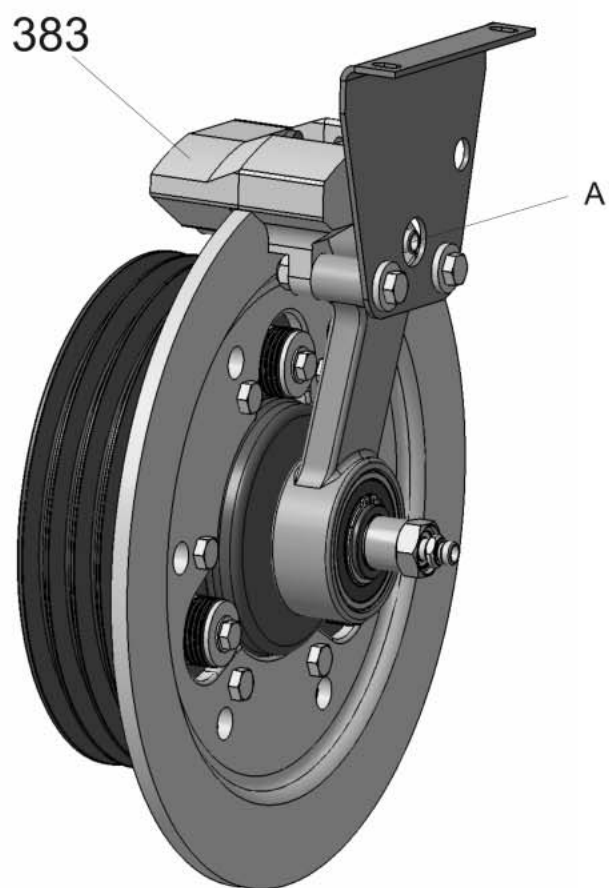
The valve insert of the front attachment quick stop solenoid valve (Y101) assumes this function.

When the solenoid valve is actuated, the valve tappet opens the ball and at the same time closes the connection to the tank (T1) with its cone.

Oil flows via the opened ball and port (A) into the front attachment quick stop hydraulic cylinder (383).

When the pressure in port (A) rises above 120 bar, the valve insert cone opens the connection to the tank (T1) = pressure relief valve function.

**Note:** To ensure a suitable air gap between the brake disc and the brake piston, only a very low neutral circulation pressure may exist. For this reason, the quick stop function has a separate return line into the reel pump housing.

**Front Attachment Quick Stop**  
Hydraulic cylinder (brake caliper)

400359

**Key to diagram:**

383	Front attachment quick stop hydraulic cylinder
Y101	Front attachment quick stop solenoid coil
A	Speed adjustment hydraulic cylinder port
P1	Pump via master valve port
T1	Tank port



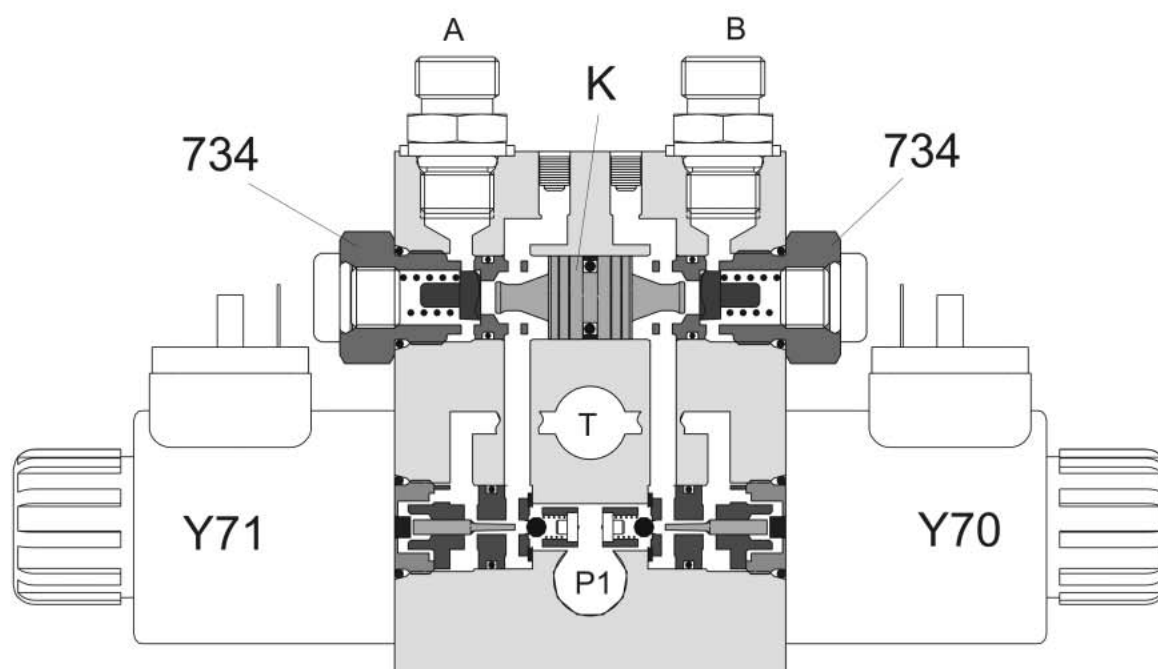
## 3.9

### Cutterbar Spring Lock

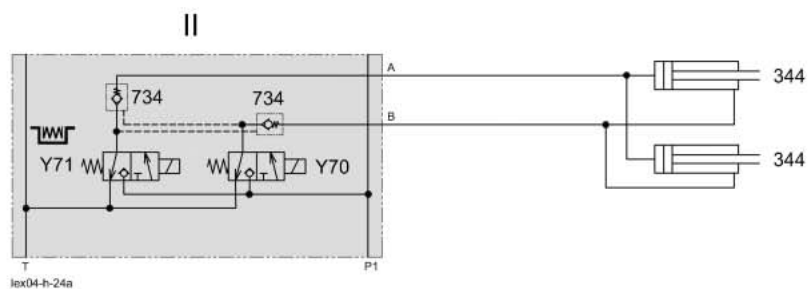
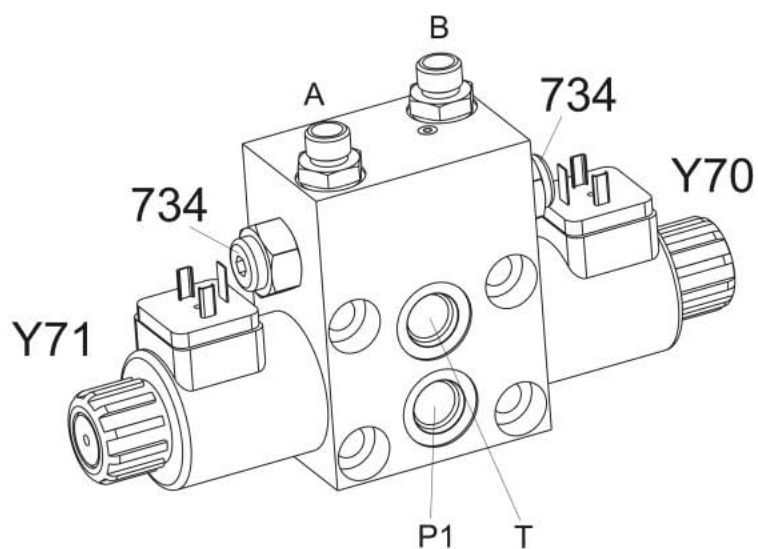
<b>3.9.1</b>	<b>Cutterbar Spring Lock.....</b>	<b>3-92</b>
	4/3 way solenoid valve with lock-up valve unit .....	3-92
	Hydraulic cylinders .....	3-94

**3.9.1 Cutterbar Spring Lock**

4/3 way solenoid valve with lock-up valve unit



H 1177.0



400328

**Key to diagram:**

344	Lock cutterbar spring hydraulic cylinder
734	Non-return valve (Lock-up valve unit)
Y70	Unlock cutterbar spring solenoid valve
Y71	Lock cutterbar spring solenoid valve
T	Tank port
P1	Pump via master valve port
A	Hydraulic cylinder port
B	Unlock cutterbar spring hydraulic cylinder port
K	Piston

**Description of function:**

## Neutral function

Both sides of the hydraulic cylinder (344) are closed tightly by the non-return valves (734) in the consumer ports A and B.

## Description of function

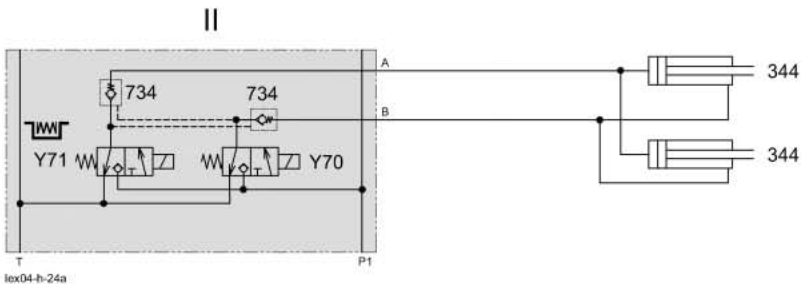
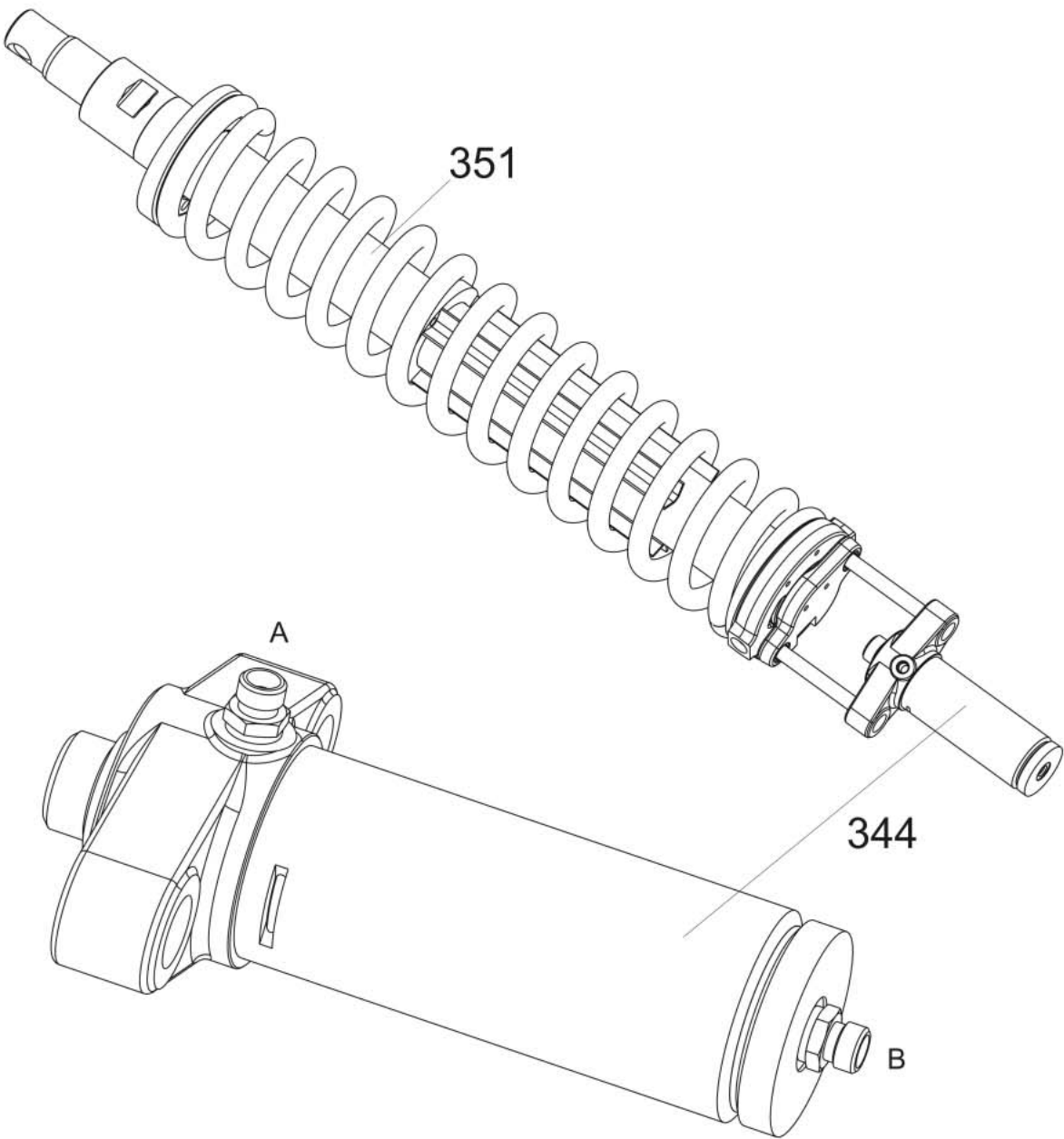
Depending on the necessary direction of movement, one of the solenoid valves (Y70/Y71) and, at the same time, the master valve (Y77) is actuated. The corresponding pilot spool opens the ball in the valve insert and closes the return line to the tank. The pressure which consequently rises builds up against piston (K) and opens the non-return valve (734) at port A or B.

The return line of the hydraulic cylinder is thus released to the tank via the valve insert of the unactuated solenoid valve (Y70/Y71).

The pressure rising further now opens the non-return valve (734) at the opposite port and the hydraulic cylinders are retracted or extended.

**Note:** When the cutterbar springs are locked, the AUTO-CONTOUR system has no function.

Cutterbar Spring Lock  
Hydraulic cylinders



400302



**Key to diagram:**

344	Lock cutterbar spring hydraulic cylinder
351	Raise/lower front attachment hydraulic cylinder
734	Non-return valve (Lock-up valve unit)
Y70	Unlock cutterbar spring solenoid valve
Y71	Lock cutterbar spring solenoid valve
A	Hydraulic cylinder port
B	Unlock cutterbar spring hydraulic cylinder port

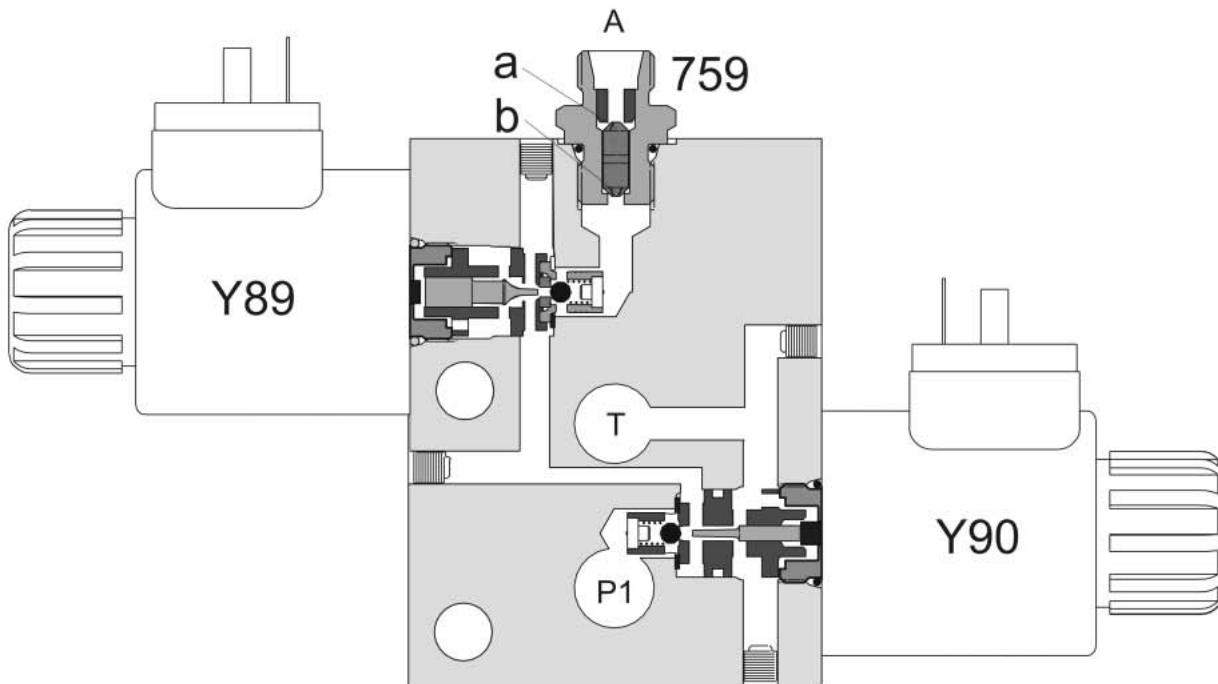


**3.10****Feed Rake  
Conveyor / Front  
Attachment Speed  
Controller**

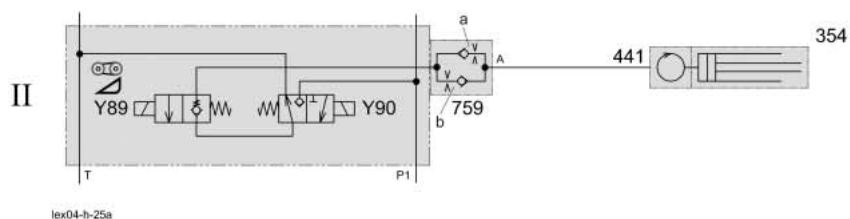
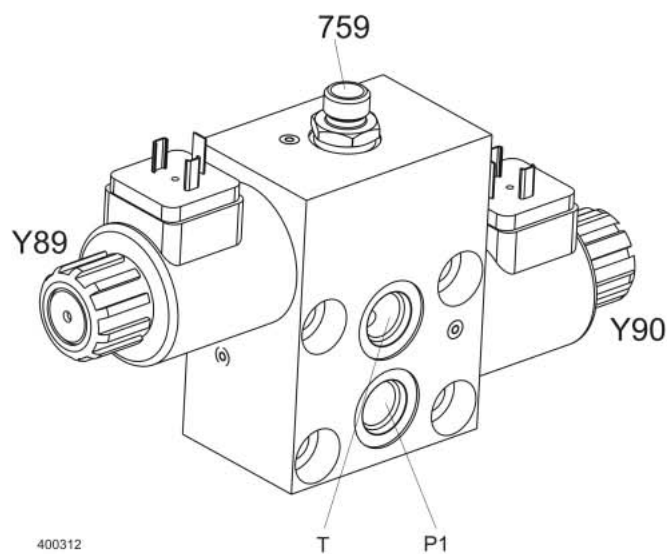
<b>3.10.1</b>	<b>Feed Rake Conveyor / Front Attachment Speed Controller.....</b>	<b>3-98</b>
	3/3 way solenoid valve .....	3-98
	Hydraulic cylinder with rotary coupling .....	3-100

### 3.10.1 Feed Rake Conveyor / Front Attachment Speed Controller

3/3 way solenoid valve



H 1170.0



400318

**Key to diagram:**

354	Front attachment variable-speed drive hydraulic cylinder
441	Rotary coupling
759	One-way restrictor valve, two-sided
Y89	Front attachment variable-speed drive slow solenoid valve
Y90	Front attachment variable-speed drive fast solenoid valve
T	Tank port
P1	Pump via master valve port
A	Speed adjustment hydraulic cylinder port
a	One-way restrictor valve – 1 notch
b	One-way restrictor valve - 2 notches
II	Working hydraulics valve block

**Description of function:****Neutral**

The front attachment variable-speed drive hydraulic cylinder (354) is tightly closed by the ball seat in the valve insert of the front attachment variable-speed drive slow solenoid valve (Y89).

**Increasing the speed**

The front attachment variable-speed drive fast solenoid valve (Y90) and the master valve (Y77) are actuated at the same time. The corresponding pilot spool opens the ball in the valve insert and closes the return line to the tank. The pressure thus rising opens the ball in the valve insert of the unactuated front attachment variable-speed drive slow solenoid valve (Y89). The oil flows to consumer port (A) via the notch (a) in the one-way restrictor valve (759).

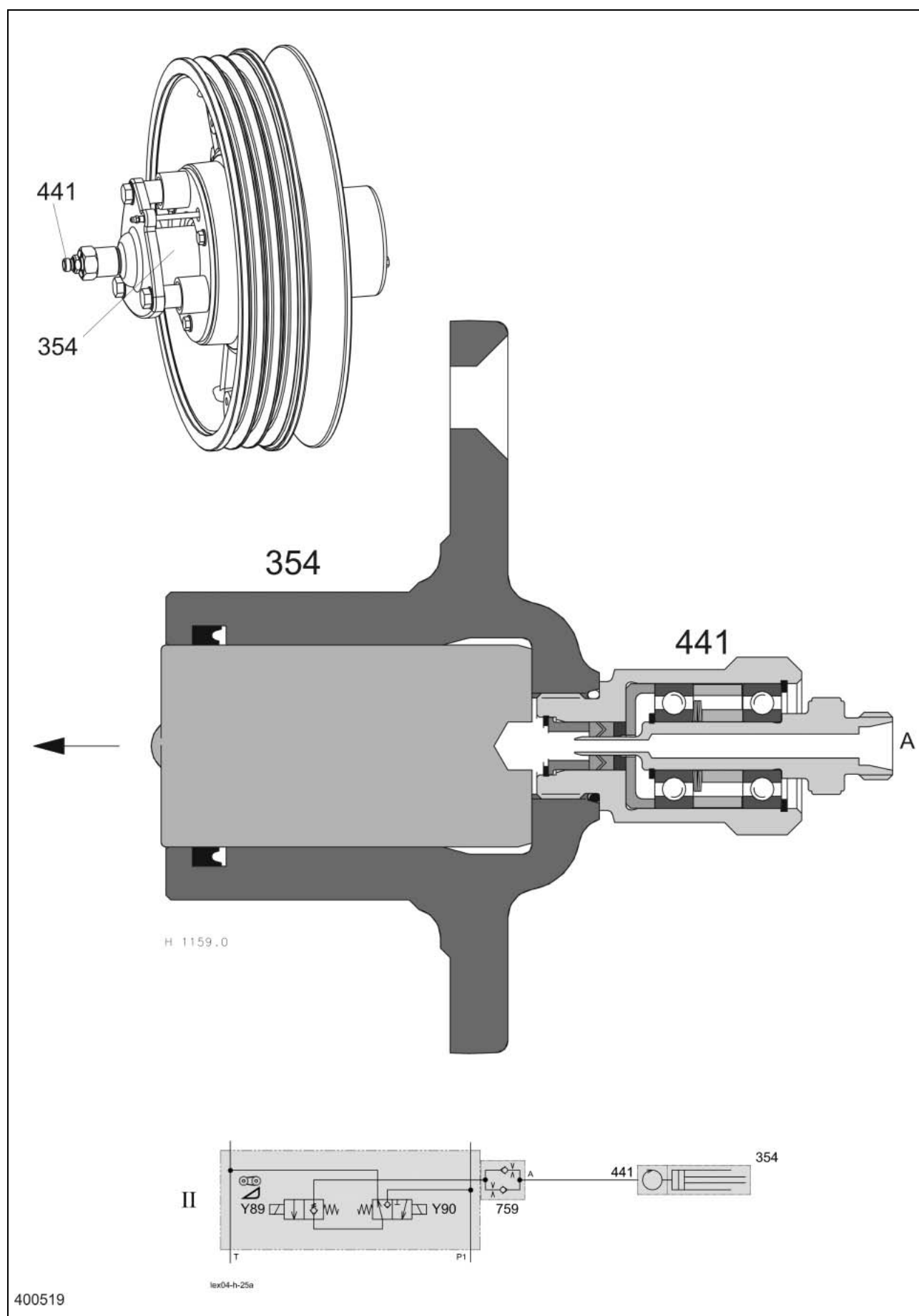
**Reducing the speed**

The front attachment variable-speed drive slow solenoid valve (Y89) is actuated without the master valve. The pilot spool in question opens the ball in the valve insert and thus relieves the oil pressure via both notches of the one-way restrictor valve (759) and the valve insert of the unactuated front attachment variable-speed drive fast solenoid valve (Y90) to the tank.

**Note:** To ensure even control function in both directions, volume flow flows via notches (b) in the one-way restrictor valve (759) when relieving the pressure of the variator (speed reduction).

**Feed Rake Conveyor / Front Attachment Speed Controller**

Hydraulic cylinder with rotary coupling



**Key to diagram:**

354	Front attachment variable-speed drive hydraulic cylinder
441	Rotary coupling
759	One-way restrictor valve, two-sided
Y89	Front attachment variable-speed drive slow solenoid valve
Y90	Front attachment variable-speed drive fast solenoid valve
A	Speed adjustment solenoid valve port
N	Seal
P1	Pump via master valve port
T	Tank port





### 3.11

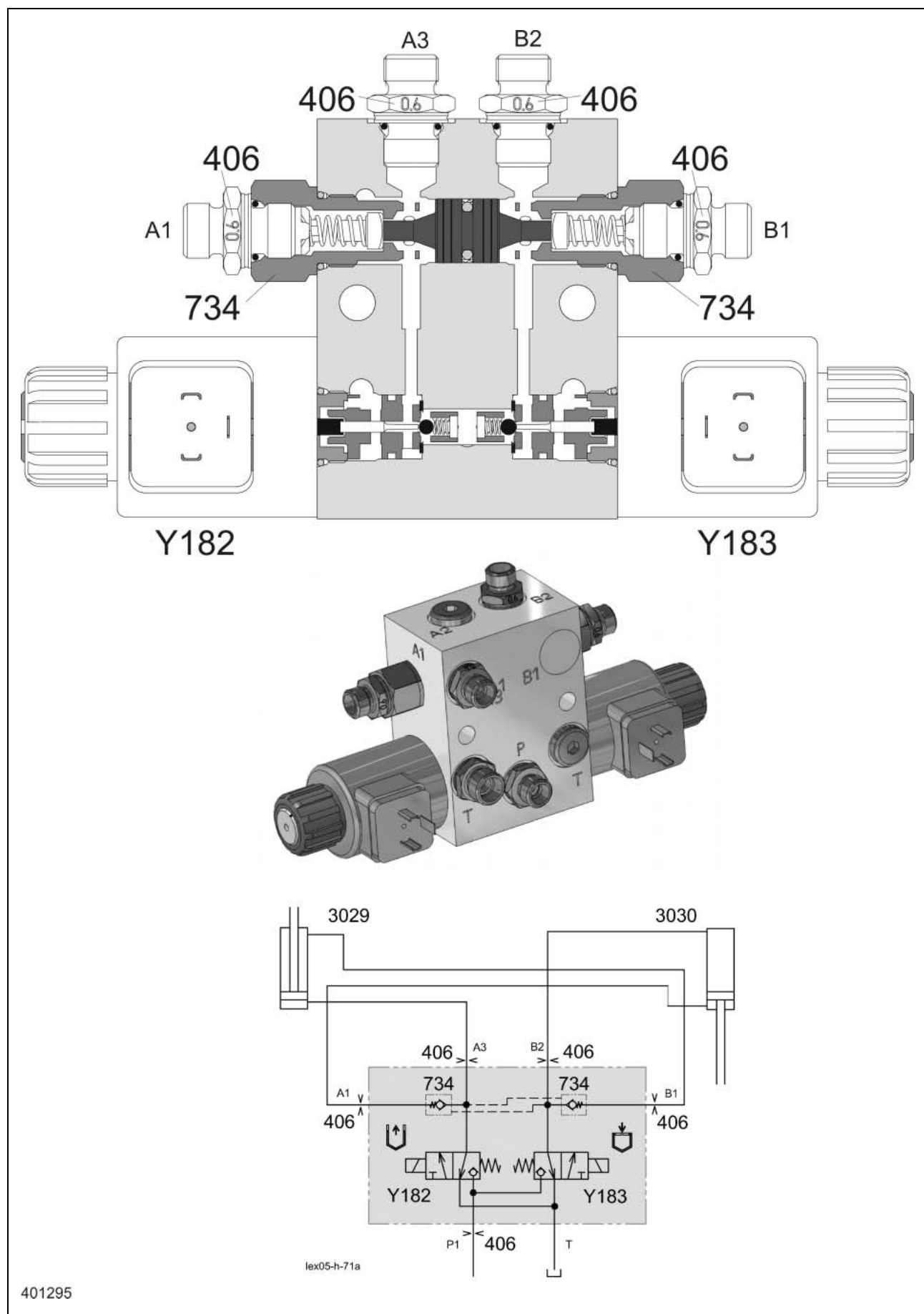
#### Open / close grain tank (hydraulic)

#### Grain Tank Unloading Aid

<b>3.11.1</b>	<b>Open / close grain tank (hydraulic).....</b>	<b>3-104</b>
	4/3 way solenoid valve with lock-up valve unit .....	3-104
	Hydraulic cylinder .....	3-106
<b>3.11.2</b>	<b>Grain Tank Unloading Aid .....</b>	<b>3-108</b>
	4/3 way solenoid valve with lock-up valve unit and pressure switches .....	3-108
	Hydraulic cylinder .....	3-110

**3.11.1 Open / close grain tank (hydraulic)**

4/3 way solenoid valve with lock-up valve unit



401295

**Key to diagram:**

3029	Grain tank cover side panels hydraulic cylinder
3030	Grain tank cover front/rear hydraulic cylinder
406	Orifice plate F.....0.8 mm
734	Lock-up valve unit (non-return valve)
Y182	Open grain tank extension solenoid valve
Y183	Close grain tank extension solenoid valve

**Description of function:**

## Open grain tank

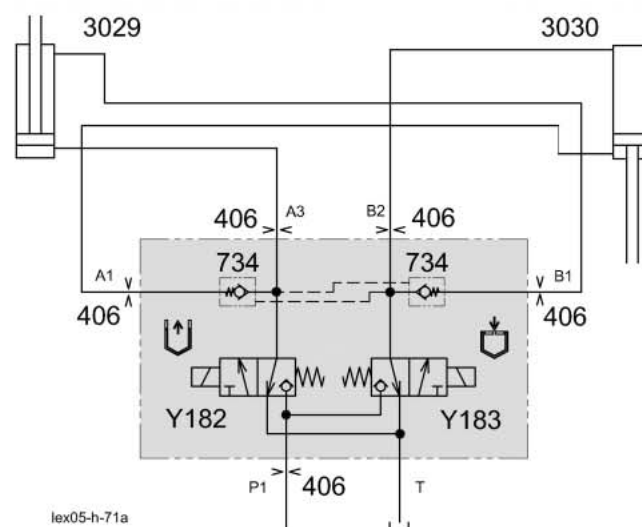
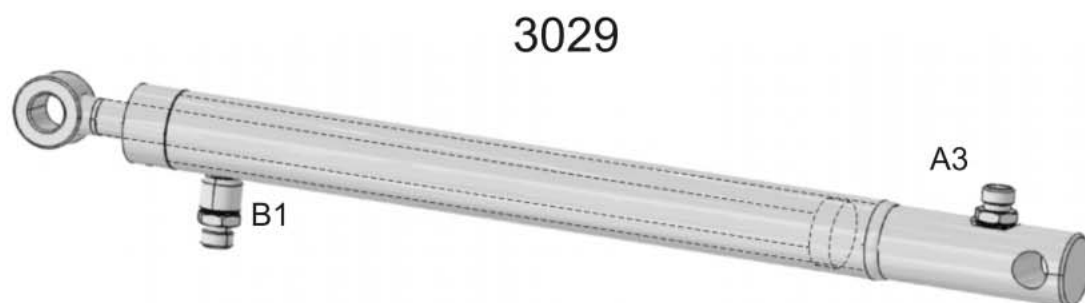
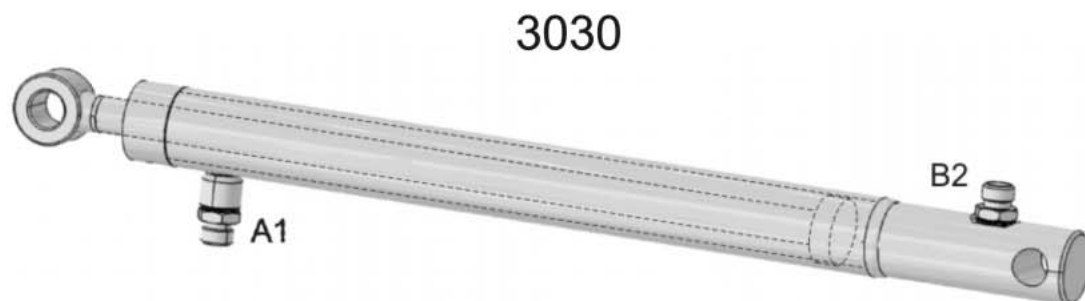
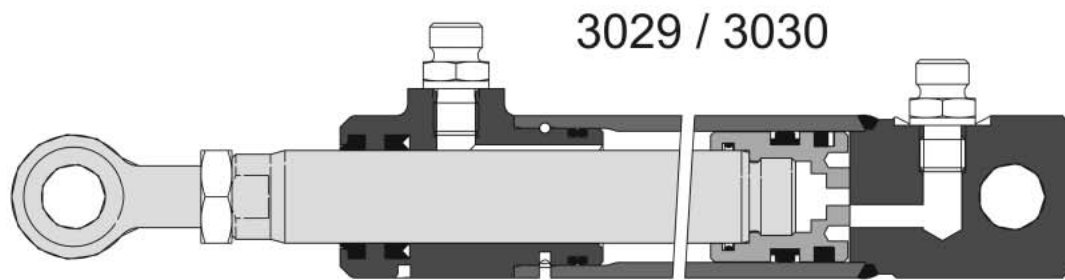
According to the desired function, the grain tank open solenoid valve (Y182) and the master valve (Y77) are energized simultaneously. Due to the area difference between the ram surface and the ram ring surface, the grain tank cover side panels hydraulic cylinder (3029) extends first and then the grain tank cover front/rear hydraulic cylinder (3030).

## Close grain tank

According to the desired function, the grain tank close solenoid valve (Y183) and the master valve (Y77) are energized simultaneously. Due to the area difference between the ram surface and the ram ring surface, the grain tank cover front/rear hydraulic cylinder (3030) retracts first and then the grain tank cover side panels hydraulic cylinder (3029).

**Open / close grain tank (hydraulic)**

Hydraulic cylinder



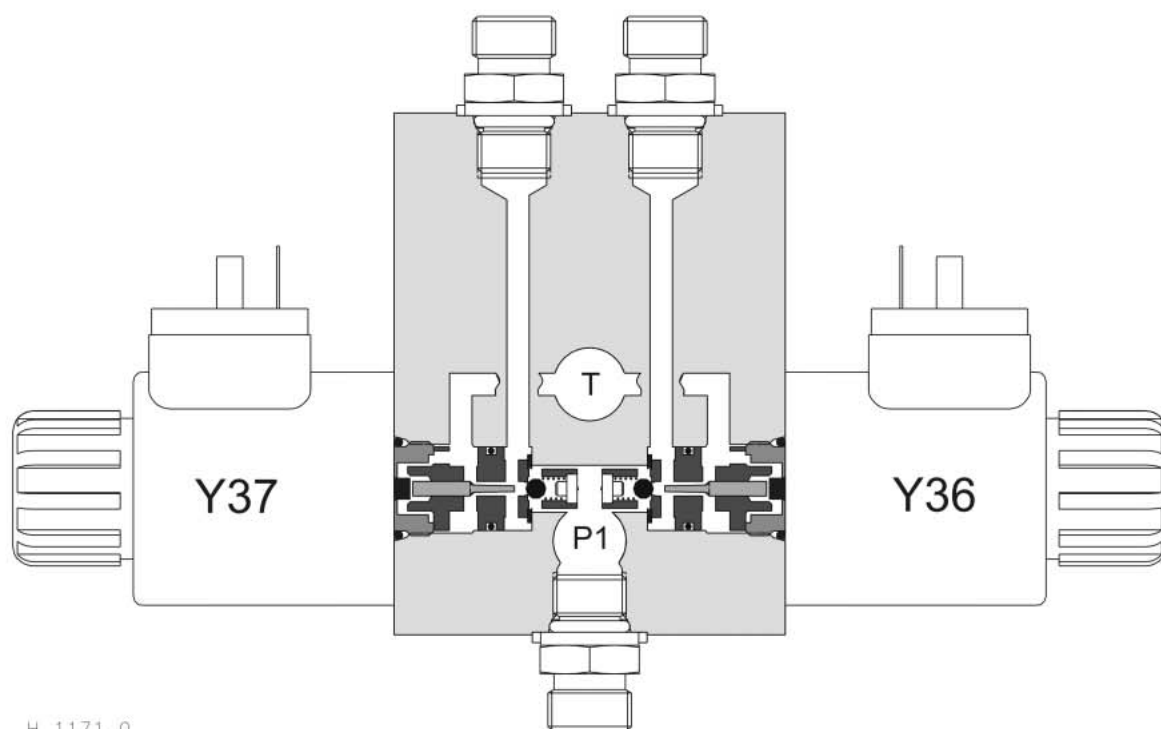
401298

**Key to diagram:**

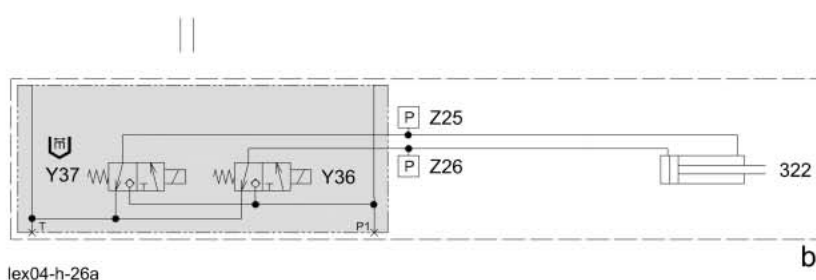
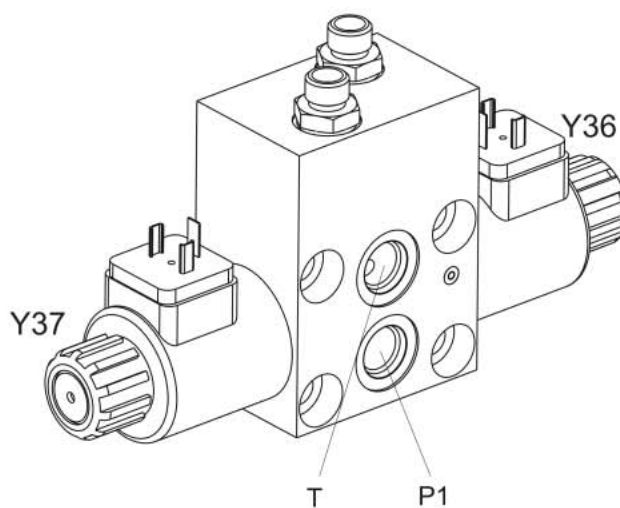
3029	Grain tank cover side panels hydraulic cylinder
3030	Grain tank cover front/rear hydraulic cylinder
406	Orifice plate F.....0.8 mm
734	Lock-up valve unit (non-return valve)
Y182	Open grain tank extension solenoid valve
Y183	Close grain tank extension solenoid valve

**3.11.2 Grain Tank Unloading Aid**

4/3 way solenoid valve with lock-up valve unit and pressure switches



H 1171.0



lex04-h-26a

b

400319

**Key to diagram:**

322	Grain tank unloading aid hydraulic cylinder
Y36	Grain tank unloading aid forward solenoid valve
Y37	Grain tank unloading aid backward solenoid valve
Z25	Grain tank unloading aid forward actual value switch ..... 120 bar
Z26	Grain tank unloading aid backward actual value switch ..... 80 bar
T	Tank port
P1	Pump via master valve port
A	Grain tank unloading aid backward hydraulic cylinder port
B	Grain tank unloading aid forward hydraulic cylinder port
b	Grain tank unloading aid valve unit (option)

**Description of function:**

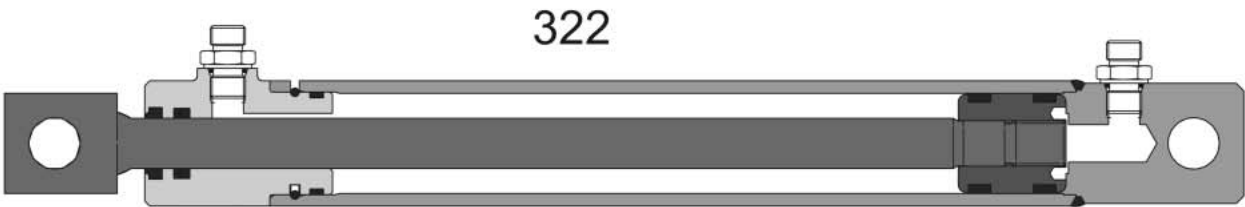
## Neutral function

Both sides of the hydraulic cylinder are connected to the tank (T) via the valve inserts of the unactuated solenoid valves (Y36/Y37). This allows moving the unloading aid by hand.

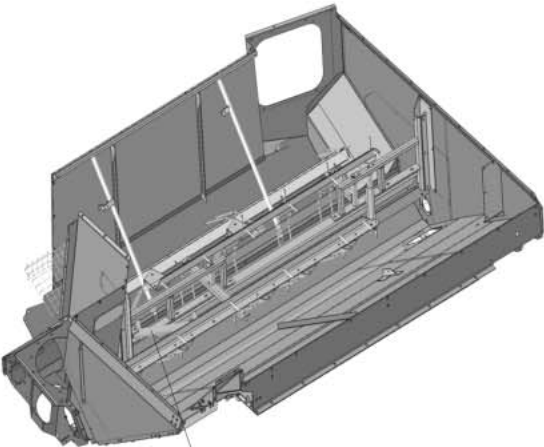
## Description of function

Depending on the required direction of movement, one of the solenoid valves (Y36/Y37) is actuated. The pilot spool thus actuated opens the ball in the valve insert and closes the return line to the tank. Pressure P1 is transmitted to the hydraulic cylinder (322) (against the pressure applied in the hydraulic cylinder) via the corresponding port (A/B). The ram of hydraulic cylinder (322) starts moving and displaces the volume flow via the unactuated solenoid valve (Y36/Y37) into the tank (T). The oil pressure switches (Z25/Z26) automatically switch over the direction of movement of hydraulic cylinder (322) when an end position is reached.

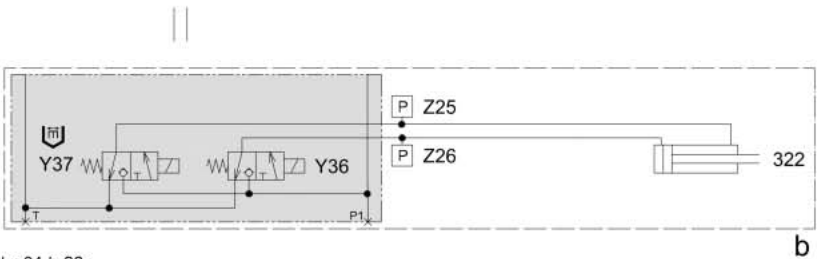
Grain Tank Unloading Aid  
Hydraulic cylinder



H 1214.0



322





**Key to diagram:**

322	Grain tank unloading aid hydraulic cylinder
Y36	Grain tank unloading aid forward solenoid valve
Y37	Grain tank unloading aid backward solenoid valve
Z25	Grain tank unloading aid backward actual value switch
Z26	Grain tank unloading aid backward actual value switch
b	Grain tank unloading aid equipment (option)



## 3.12

### AUTO-CONTOUR (CAC)

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	Hydraulic cylinder with bottom valves .....	3-144



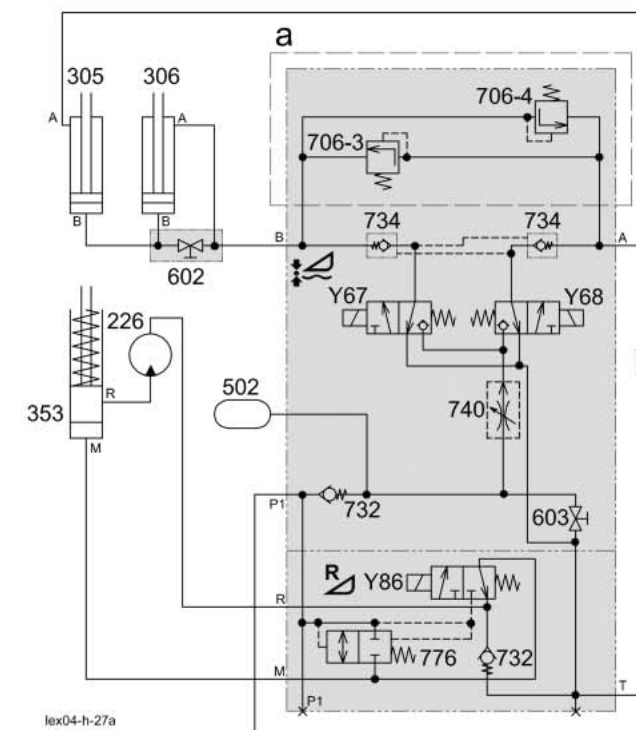
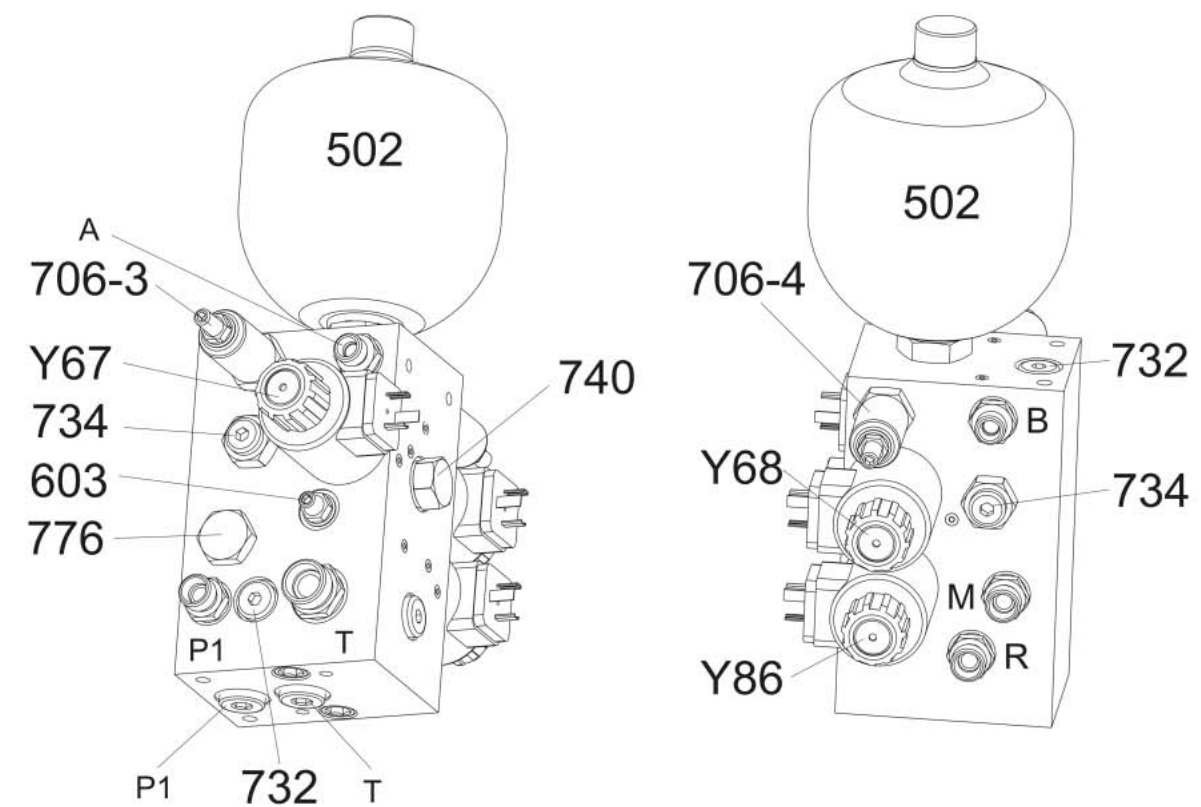
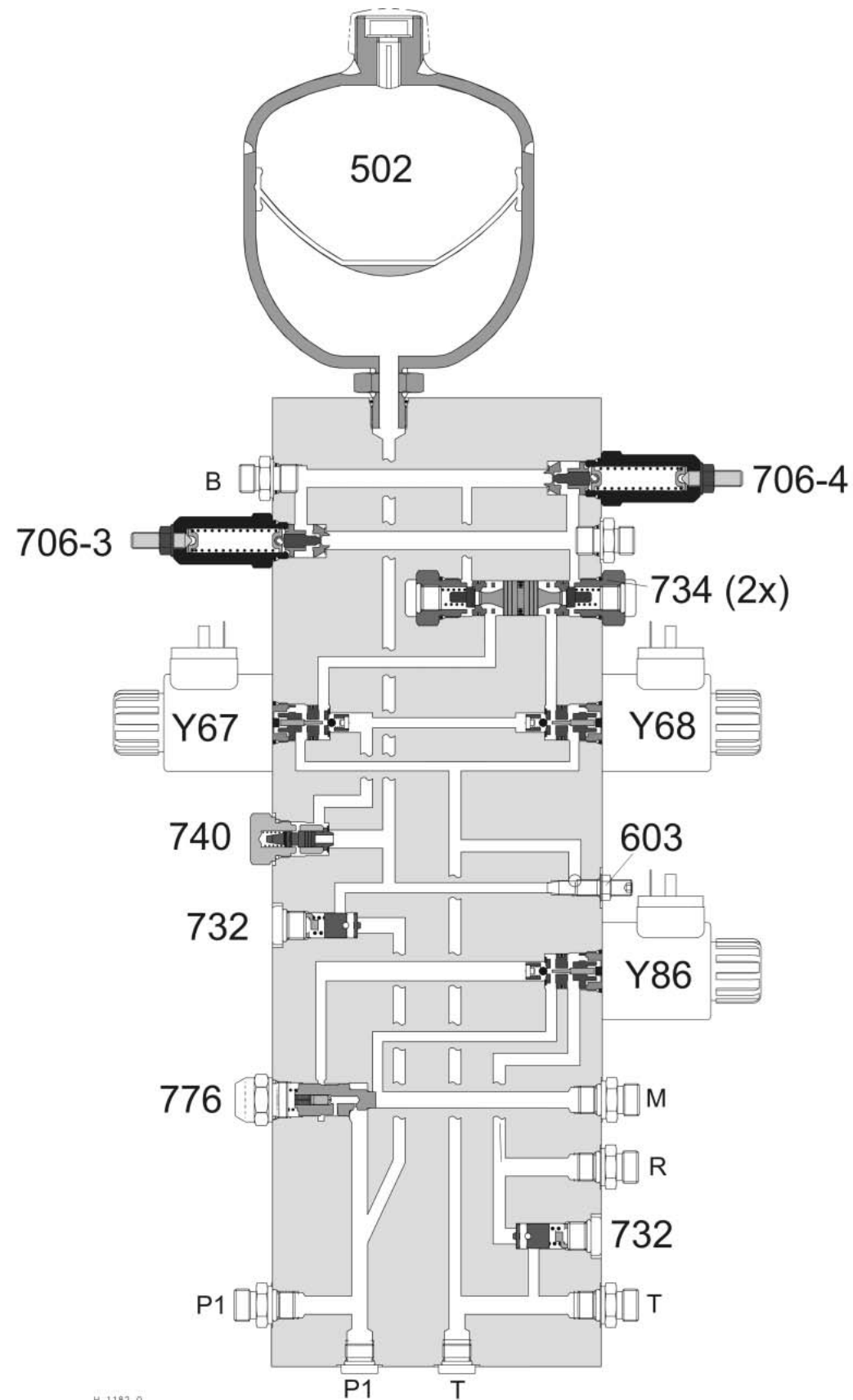
### **3.12.1**

#### **AUTO-CONTOUR (CAC) - Front attachment cross levelling**

LEXION 580 - 510

up to serial no. 58600336,  
58500162,  
58400895,  
58300298

**3.12.1 AUTO-CONTOUR (CAC) – Front attachment cross levelling - LEXION 580 - 510 up to serial no. 58600336, 58500162, 58400895, 58300298**  
4/3 way solenoid valve with accumulator and lock-up valve unit



**Key to diagram:**

226	Front attachment reverser drive motor .....OMR200
305	AUTOCONTOUR cross levelling right hydraulic cylinder
306	AUTOCONTOUR cross levelling left hydraulic cylinder
353	Reverse front attachment hydraulic cylinder
502	Cross levelling accumulator .....0.7 l / 80 bar
602	AUTOCONTOUR cross levelling shut-off valve
603	Pressure relief bolt
706-3*	Cross levelling pressure relief valve (Montana).....200 bar
706-4*	Cross levelling pressure relief valve (Montana).....200 bar
732	Non-return valve (inlet valve)
734	Non-return valve (Lock-up valve unit)
740	AUTOCONTOUR cross levelling flow control valve
740	Flow control valve
776	Reversing connecting valve
Y67	Front attachment cross levelling left solenoid valve
Y68	Front attachment cross levelling right solenoid valve
Y86	Reverse front attachment solenoid valve
a	Valve block with integrated pressure relief valve Series equipment for MONTANA machines, otherwise available as an option
A	Front attachment cross levelling right hydraulic cylinder port
B	Front attachment cross levelling left hydraulic cylinder port
K	Piston
M	Front attachment reverse hydraulic cylinder port
P1	Pump via master valve port
R	Return line port (tank)
T	Tank port
III	AUTOCONTOUR / Reverse valve block

**Note:** When dismantling items 732, 502, 740, Y67 or Y68, the accumulator must be relieved at the pressure relief bolt (603) before.

**Description of function:****AUTOCONTOUR (CAC)**

As soon as the cutterbar is engaged, the CAC module (A8) actuates the master valve for approx. 1 sec. This short-time pressure build-up within the system pre-loads the accumulator (502) via the non-return valve (732).

The CAC module also actuates the master valve if the total actuated time of both solenoid valves (Y67/Y68) exceeds 10 seconds in order to pre-load the accumulator (502) again.

The pressure in this closed system is thus applied at the balls in the valve inserts of solenoid valves (Y67/Y68). The flow control valve (740) here has the task to provide a constant volume flow in order to ensure constant control movements of the cutterbar at different pressure values.

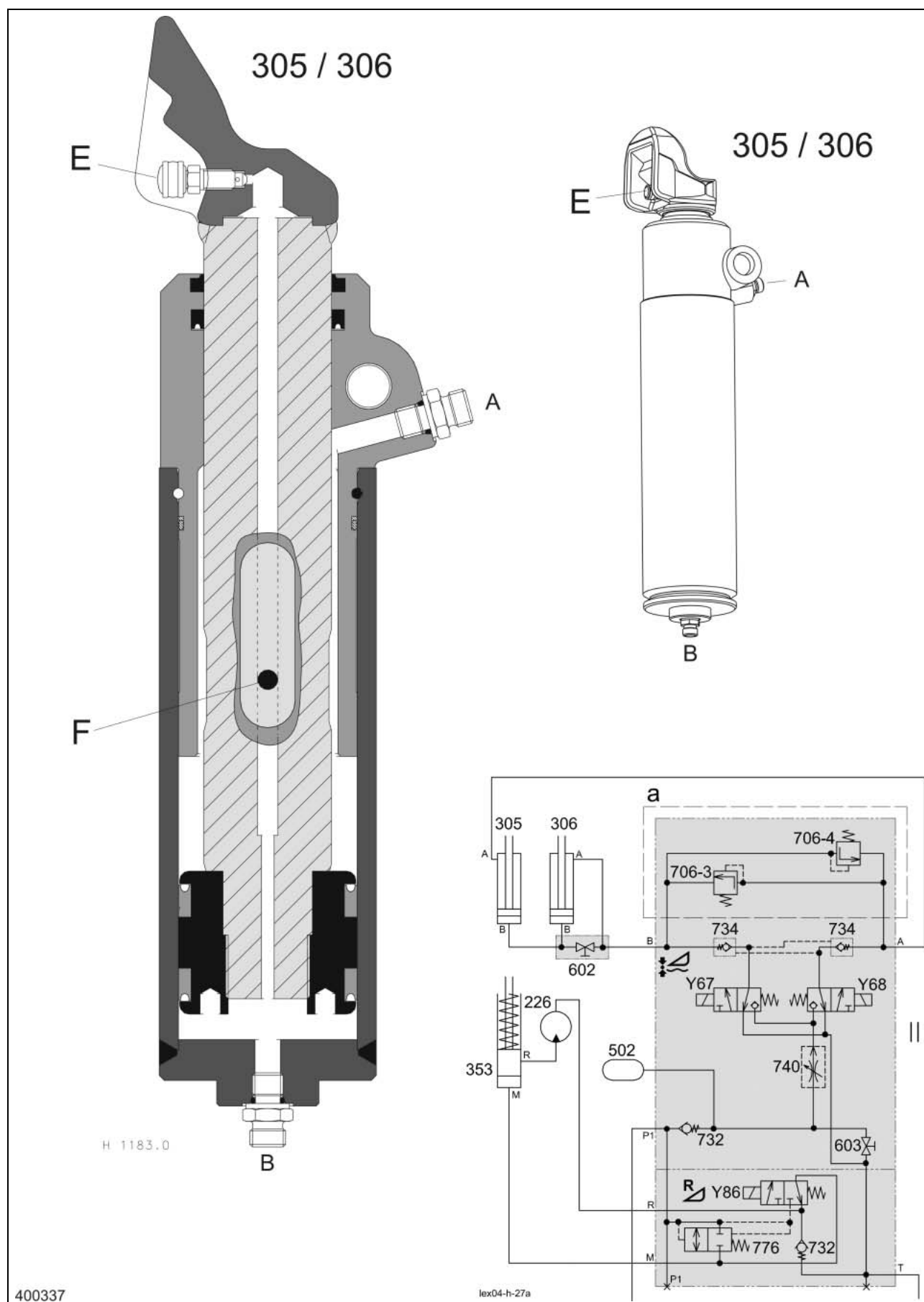
One of the solenoid valves (Y67/Y68) is actuated by the CAC module, depending on the required swinging direction of the front attachment. The corresponding pilot spool opens the ball in the valve insert and closes the return line to the tank. The rising pressure builds up against the piston (K) and in this process opens the non-return valve (734) at port A or B.

The return line of a variable-speed drive cylinder is therefore connected with the tank via the valve insert of the unactuated solenoid valve (Y67/Y68). The pressure which rises further opens the non-return valve (734) at the opposite port. The hydraulic cylinder in question is retracted while the other hydraulic cylinder is extended proportionally.



**Notes:**

**AUTO-CONTOUR (CAC) – Front attachment cross levelling -  
LEXION 580 - 510 up to serial no. 58600336, 58500162, 58400895, 58300298**  
Hydraulic cylinder with ram guide



**Key to diagram:**

226	Front attachment reverser drive motor ..... OMR200
305	AUTOCONTOUR cross levelling right hydraulic cylinder
306	AUTOCONTOUR cross levelling left hydraulic cylinder
353	Reverse front attachment hydraulic cylinder
502	Cross levelling accumulator ..... 0.7 l / 80 bar
602	AUTOCONTOUR cross levelling shut-off valve
603	Pressure relief bolt
706-3*	Cross levelling pressure relief valve (Montana).... 200 bar
706-4*	Cross levelling pressure relief valve (Montana).... 200 bar
732	Non-return valve (Inlet valve)
734	Non-return valve (Lock-up valve unit)
740	AUTOCONTOUR cross levelling flow control valve
740	Flow control valve
776	Reversing connecting valve
Y67	Front attachment cross levelling left solenoid valve
Y68	Front attachment cross levelling right solenoid valve
Y86	Reverse front attachment solenoid valve
a	Valve block with integrated pressure relief valve Series equipment for MONTANA machines, otherwise available as an option
A	Front attachment cross levelling right hydraulic cylinder port
B	Front attachment cross levelling left hydraulic cylinder port
F	Guard against torsion
K	Piston
M	Front attachment reverse hydraulic cylinder port
P1	Pump via master valve port
R	Return line port (tank)
T	Tank port
III	AUTOCONTOUR / Reverse valve block

**Note:** When dismantling items 732, 502, 740, Y67 or Y68, the accumulator must be relieved at the pressure relief bolt (603) before.

**Description of function:**

Venting the hydraulic cylinders	<ol style="list-style-type: none"><li>1. Remove front attachment.</li><li>2. Open shut-off valve (602).</li><li>3. Actuate the cross levelling rocker switch to the right until both hydraulic cylinders (305/306) are fully extended.</li><li>4. Loosen the vent plug E on both hydraulic cylinders.</li><li>5. Push the cross levelling rocker switch briefly one more time until the oil comes out at the vent plug (E) without bubbles.</li><li>6. Close the vent plugs (E) after the air has escaped.</li><li>7. Actuate the cross levelling rocker switch in opposite direction until the left-hand hydraulic cylinder (306) is fully retracted.</li><li>8. Close shut-off valve (602).</li><li>9. Retract and extend the hydraulic cylinders (305/306) several times, using the rocker switch.</li></ol>
Compensating the hydraulic cylinder (for cutterbar and Conspeed)	<ol style="list-style-type: none"><li>1. Remove front attachment.</li><li>2. Open shut-off valve (602).</li><li>3. Actuate the cross levelling rocker switch to the right until both hydraulic cylinders (305/306) are fully extended.</li><li>4. Actuate the transverse control rocker switch in opposite direction until the right-hand hydraulic cylinder (305) is fully retracted.</li><li>5. Close shut-off valve (602).</li><li>6. Move both hydraulic cylinders (305/306) to centre position using the transverse control rocker switch.</li></ol>
Lowering the hydraulic cylinder (for Multimaster)	<ol style="list-style-type: none"><li>1. Hitch front attachment.</li><li>2. Actuate the transverse control rocker switch so that the right-hand hydraulic cylinder (305) extends and thus turns the front attachment to the left.</li><li>3. Open shut-off valve (602).</li><li>4. Actuate the transverse control rocker switch in opposite direction so that the right-hand hydraulic cylinder (305) retracts.</li><li>5. Close shut-off valve (602).</li></ol>

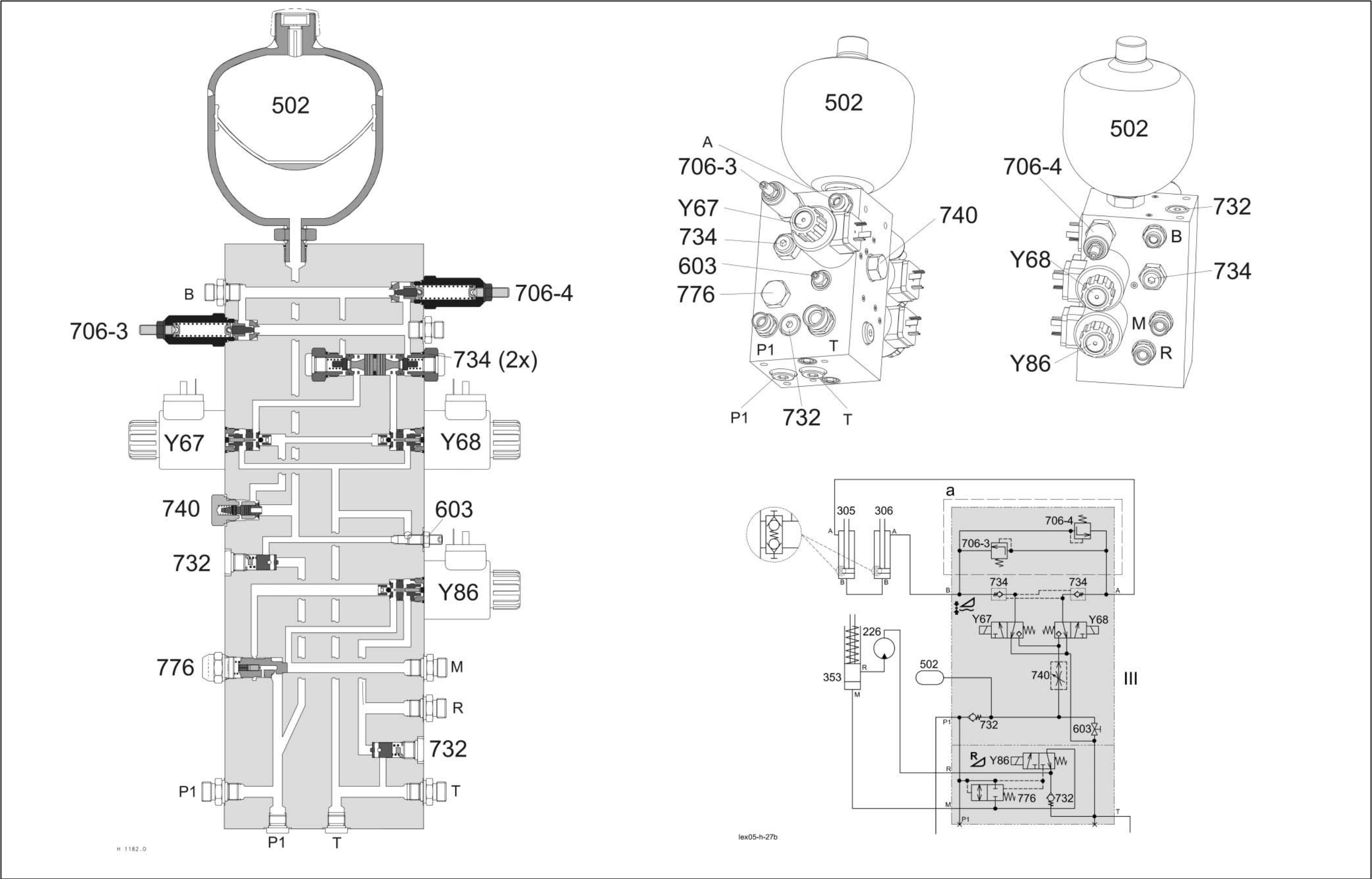
### **3.12.2**

#### **AUTO-CONTOUR (CAC) - Front attachment cross levelling**

LEXION 580 - 510

from serial no. 58600337,  
58500163,  
58400896,  
58300299

3.12.2 AUTO-CONTOUR (CAC) – Front attachment cross levelling -  
LEXION 580 - 510 from serial no. 58600337, 58500163, 58400896, 58300299  
4/3 way solenoid valve with accumulator and lock-up valve unit



**Key to diagram:**

226	Front attachment reverser drive motor ..... OMR200
305	AUTOCONTOUR cross levelling right hydraulic cylinder
306	AUTOCONTOUR cross levelling left hydraulic cylinder
353	Reverse front attachment hydraulic cylinder
502	Cross levelling accumulator ..... 0.7 l / 80 bar
603	Pressure relief bolt
706-3*	Cross levelling pressure relief valve (Montana).... 200 bar
706-4*	Cross levelling pressure relief valve (Montana).... 200 bar
732	Non-return valve (Inlet valve)
734	Non-return valve (Lock-up valve unit)
740	AUTOCONTOUR cross levelling flow control valve
740	Flow control valve
776	Reversing connecting valve
Y67	Front attachment cross levelling left solenoid valve
Y68	Front attachment cross levelling right solenoid valve
Y86	Reverse front attachment solenoid valve
a	Valve block with integrated pressure relief valve Series equipment for MONTANA machines, otherwise available as an option
A	Front attachment cross levelling right hydraulic cylinder port
B	Front attachment cross levelling left hydraulic cylinder port
K	Piston
M	Front attachment reverse hydraulic cylinder port
P1	Pump via master valve port
R	Return line port (tank)
T	Tank port
III	AUTOCONTOUR / Reverse valve block

**Note:** When dismantling items 732, 502, 740, Y67 or Y68, the accumulator must be relieved at the pressure relief bolt (603) before.

**Description of function:****AUTOCONTOUR (CAC)**

As soon as the cutterbar is engaged, the CAC module (A8) actuates the master valve for approx. 1 sec. This short-time pressure build-up within the system pre-loads the accumulator (502) via the non-return valve (732).

The CAC module also actuates the master valve if the total actuated time of both solenoid valves (Y67/Y68) exceeds 10 seconds in order to pre-load the accumulator (502) again.

The pressure in this closed system is thus applied at the balls in the valve inserts of solenoid valves (Y67/Y68). The flow control valve (740) here has the task to provide a constant volume flow in order to ensure constant control movements of the cutterbar at different pressure values.

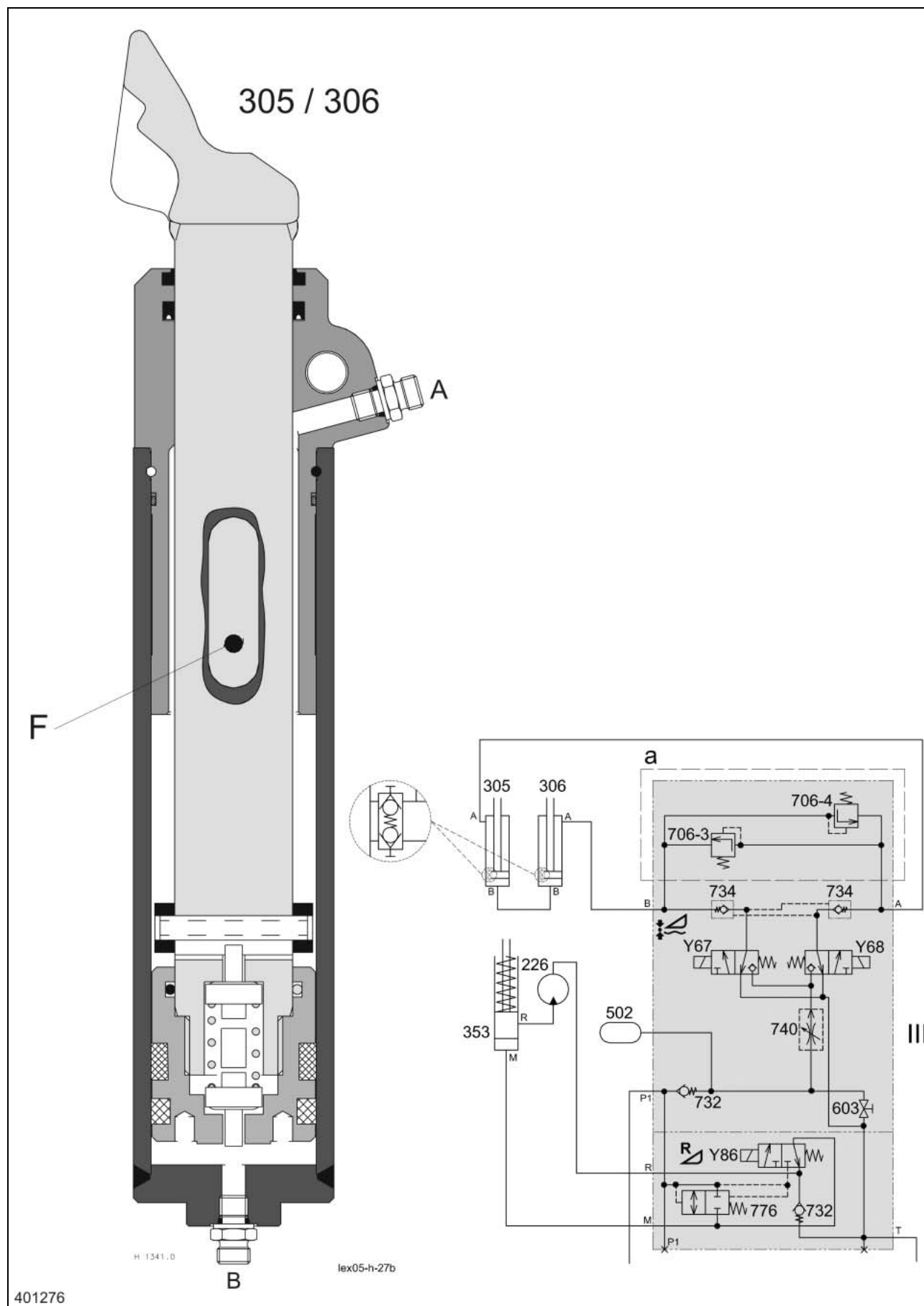
One of the solenoid valves (Y67/Y68) is actuated by the CAC module, depending on the required swinging direction of the front attachment. The corresponding pilot spool opens the ball in the valve insert and closes the return line to the tank. The rising pressure builds up against the piston (K) and in this process opens the non-return valve (734) at port A or B.

The return line of a variable-speed drive cylinder is therefore connected with the tank via the valve insert of the unactuated solenoid valve (Y67/Y68). The pressure which rises further opens the non-return valve (734) at the opposite port. The hydraulic cylinder in question is retracted while the other hydraulic cylinder is extended proportionally.



**Notes:**

**AUTO-CONTOUR (CAC) – Front attachment cross levelling -**  
**LEXION 580 - 510 from serial no. 58600337, 58500163, 58400896, 58300299**  
 Hydraulic cylinder with bottom valves



**Key to diagram:**

226	Front attachment reverser drive motor ..... OMR200
305	AUTOCONTOUR cross levelling right hydraulic cylinder
306	AUTOCONTOUR cross levelling left hydraulic cylinder
353	Reverse front attachment hydraulic cylinder
502	Cross levelling accumulator ..... 0.7 l / 80 bar
603	Pressure relief bolt
706-3*	Cross levelling pressure relief valve (Montana).... 200 bar
706-4*	Cross levelling pressure relief valve (Montana).... 200 bar
732	Non-return valve (Inlet valve)
734	Non-return valve (Lock-up valve unit)
740	AUTOCONTOUR cross levelling flow control valve
740	Flow control valve
776	Reversing connecting valve
Y67	Front attachment cross levelling left solenoid valve
Y68	Front attachment cross levelling right solenoid valve
Y86	Reverse front attachment solenoid valve
a	Valve block with integrated pressure relief valve Series equipment for MONTANA machines, otherwise available as an option
A	Front attachment cross levelling right hydraulic cylinder port
B	Front attachment cross levelling left hydraulic cylinder port
F	Guard against torsion
K	Piston
M	Front attachment reverse hydraulic cylinder port
P1	Pump via master valve port
R	Return line port (tank)
T	Tank port
III	AUTOCONTOUR / Reverse valve block

**Note:** When dismantling items 732, 502, 740, Y67 or Y68, the accumulator must be relieved at the pressure relief bolt (603) before.

**Description of function:****Bottom valves**

The bottom valves (V) in master cylinder (315) are opened upon reaching the upper end stop position so that the slave cylinder can be filled and vented.



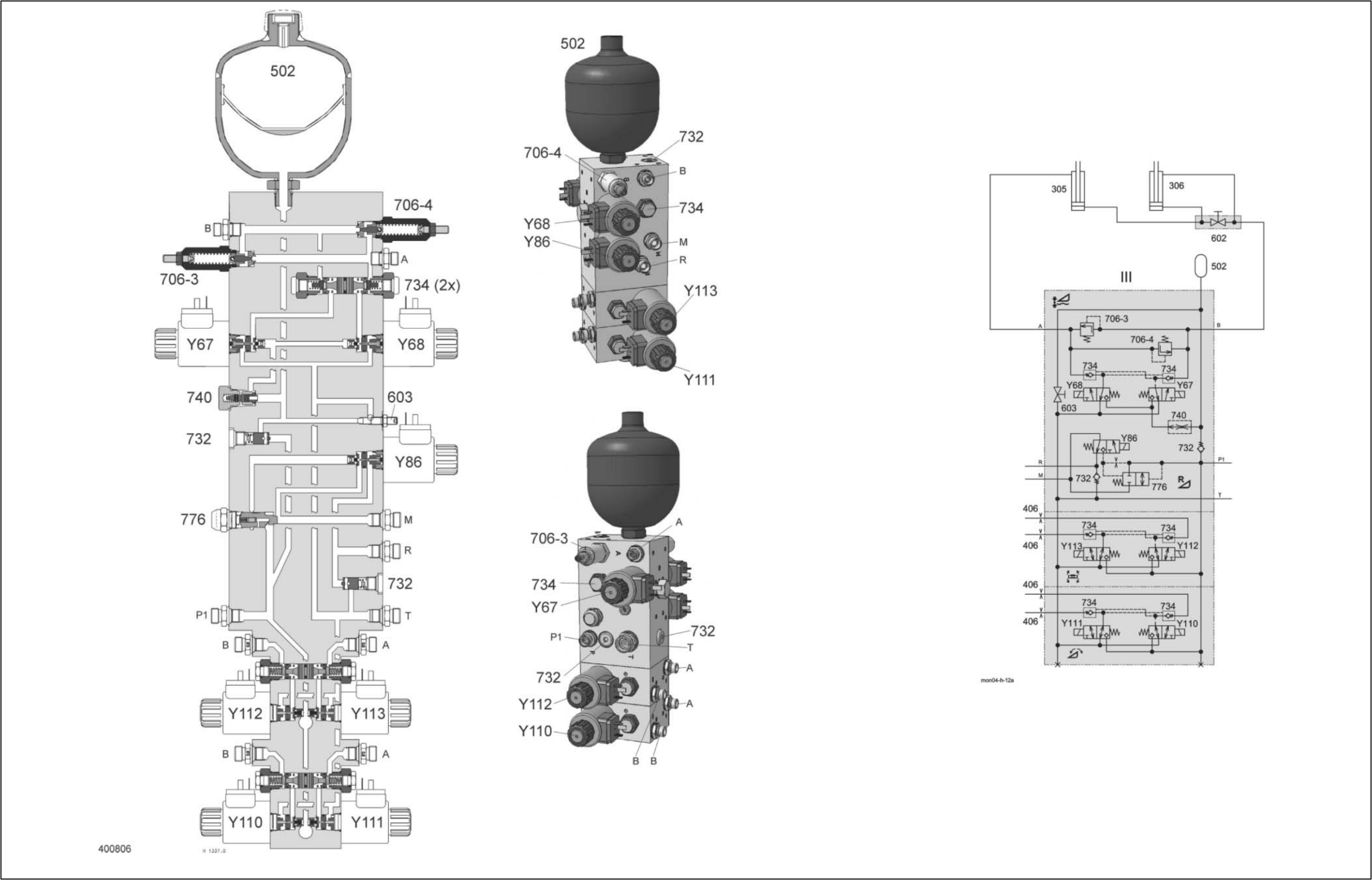
### **3.12.3**

#### **AUTO-CONTOUR (CAC) - Front attachment cross levelling**

LEXION Montana 570-520

up to serial no. 58200051,  
58100037  
58000028

3.12.3 AUTO-CONTOUR (CAC) – Front attachment cross levelling -  
LEXION Montana up to serial no. 582 00051, 581 00037, 580 00028  
4/3 way solenoid valve with accumulator and lock-up valve unit



**Key to diagram:**

305	AUTOCONTOUR cross levelling right hydraulic cylinder
306	AUTOCONTOUR cross levelling left hydraulic cylinder
406	Orifice plate F .....0.8 mm
502	AUTOCONTOUR / Cross levelling accumulator
602	AUTOCONTOUR / Cross levelling shut-off valve
603	AUTOCONTOUR / Cross levelling balance screw
706-3*	Cross levelling pressure relief valve (Montana).....200 bar
706-4*	Cross levelling pressure relief valve (Montana).....200 bar
732	Non-return valve
734	Lock-up valve unit (non-return valve)
740	AUTOCONTOUR cross levelling flow control valve
776	Reversing connecting valve
Y67	AUTOCONTOUR cross levelling left solenoid valve
Y68	AUTOCONTOUR cross levelling right solenoid valve
Y110	Raise cutting angle solenoid valve
Y111	Lower cutting angle solenoid valve
Y112	Rotate front attachment to the right solenoid valve
Y113	Rotate front attachment to the left solenoid valve
III	Autocontour / Reverse valve block

**Note:** When dismantling items 502, 732, 740, Y67 or Y68, the accumulator must be relieved at the pressure relief bolt (603) before.

**Description of function:****AUTOCONTOUR (CAC)**

As soon as the cutterbar is engaged, the CAC module (A8) actuates the master valve for approx. 1 sec. The pressure build-up within the system caused by the master valve pre-loads the accumulator (502) via the non-return valve (732).

The CAC module also actuates the master valve if the total actuated time of both solenoid valves (Y67/Y68) exceeds 10 seconds in order to pre-load the accumulator (502) again.

The pressure in this closed system is thus applied at the balls in the valve inserts of solenoid valves (Y67/Y68). The flow control valve (740) here has the task to ensure constant control movements of the cutterbar at different pressure values.

One of the solenoid valves (Y67/Y68) is actuated by the CAC module, depending on the required direction of rotation. The corresponding pilot spool opens the ball in the valve insert and closes the return line to the tank. The rising pressure builds up against the lock-up valve unit valve ram. The latter opens the non-return valve (734) at port A1 or A2.

The return line of a control cylinder is therefore connected with the tank via the valve insert of the unactuated solenoid valve (Y67/Y68). The pressure rising further opens the non-return valve (734) on the opposite port and the control cylinder in question is retracted while the other control cylinder is extended proportionally.

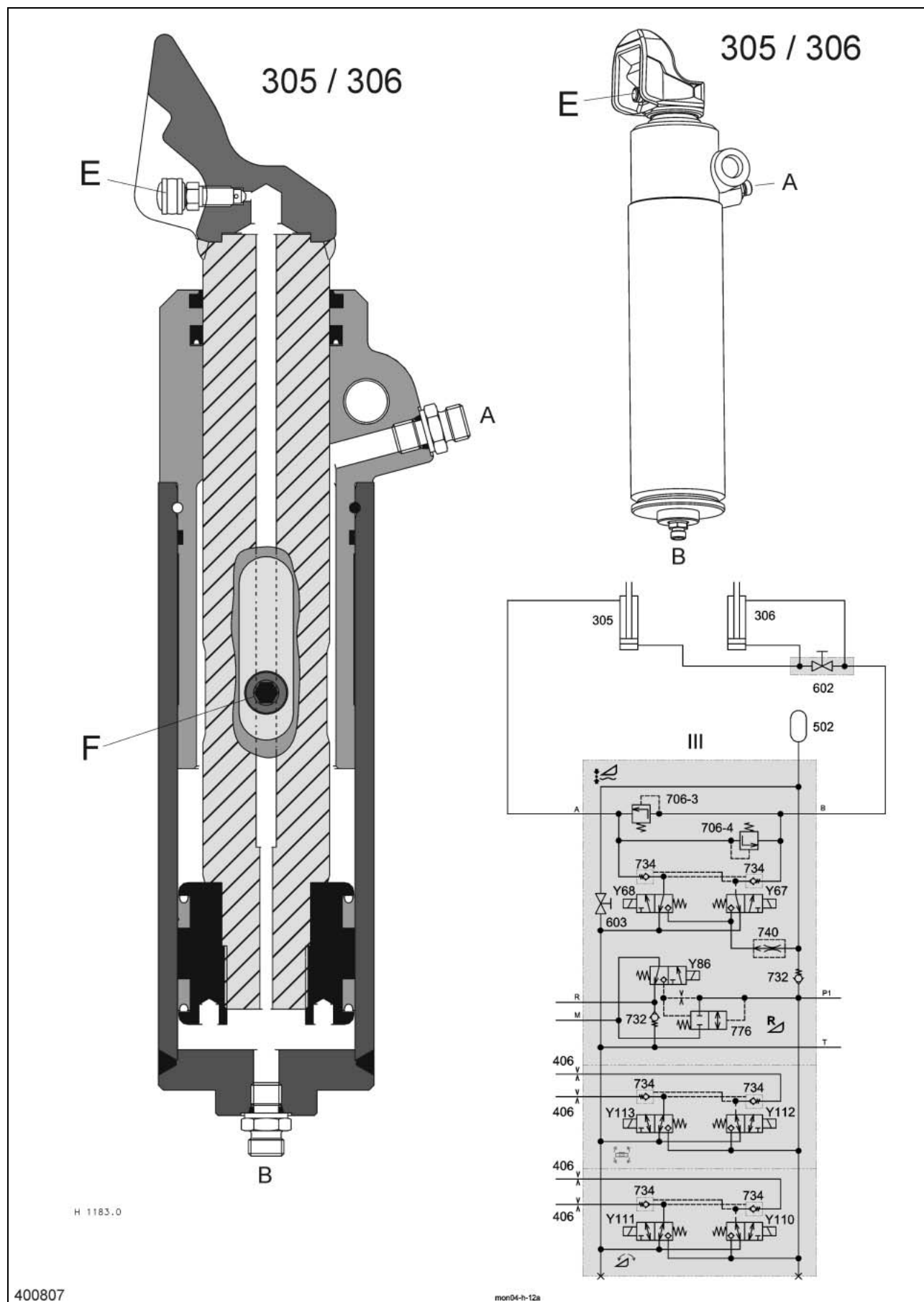
**Pressure limitation**

In addition to the standard machine features, the CAC cylinders (305/306) are protected against overload by the pressure relief valves (706-3 and 706-4).



**Notes:**

**AUTO-CONTOUR (CAC) – Front attachment cross levelling -  
LEXION Montana up to serial no. 582 00051, 581 00037, 580 00028**  
Hydraulic cylinder with ram guide



**Key to diagram:**

305	AUTOCONTOUR cross levelling right hydraulic cylinder
306	AUTOCONTOUR cross levelling left hydraulic cylinder
406	Orifice plate F .....0.8 mm
502	AUTOCONTOUR / Cross levelling accumulator
602	AUTOCONTOUR / Cross levelling shut-off valve
603	AUTOCONTOUR / Cross levelling balance screw
706-3*	Cross levelling pressure relief valve (Montana) .....200 bar
706-4*	Cross levelling pressure relief valve (Montana) .....200 bar
732	Non-return valve
734	Lock-up valve unit (non-return valve)
740	AUTOCONTOUR cross levelling flow control valve
776	Reversing connecting valve
Y67	AUTOCONTOUR cross levelling left solenoid valve
Y68	AUTOCONTOUR cross levelling right solenoid valve
Y110	Raise cutting angle solenoid valve
Y111	Lower cutting angle solenoid valve
Y112	Rotate front attachment to the right solenoid valve
Y113	Rotate front attachment to the left solenoid valve

III Autocontour / Reverse valve block

**Note:** When dismantling items 502, 732, 740, Y67 or Y68, the accumulator must be relieved at the pressure relief bolt (603) before.

**Description of function:**

Venting the hydraulic cylinders

1. Unhitch front attachment.
2. Open shut-off valve (602).
3. Actuate the cross levelling rocker switch to the right until both hydraulic cylinders (305/306) are fully extended.
4. Loosen the vent plug E on both hydraulic cylinders.
5. Press the cross levelling rocker switch briefly one more time until the oil comes out without bubbles.
6. Close the vent plugs (E) after the air has escaped.
7. Actuate the cross levelling rocker switch in opposite direction until the left-hand hydraulic cylinder (306) is fully retracted.
8. Close shut-off valve (602).
9. Retract and extend the hydraulic cylinders (305/306) several times, using the rocker switch.

Compensating the hydraulic cylinder (for cutterbar and Conspeed)

1. Unhitch front attachment.
2. Open shut-off valve (602).
3. Actuate the cross levelling rocker switch to the right until both hydraulic cylinders (305/306) are fully extended.
4. Actuate the transverse control rocker switch in opposite direction until the right-hand hydraulic cylinder (305) is fully retracted.
5. Close shut-off valve (602).
6. Move both hydraulic cylinders (305/306) to centre position using the transverse control rocker switch.

**Notes:**

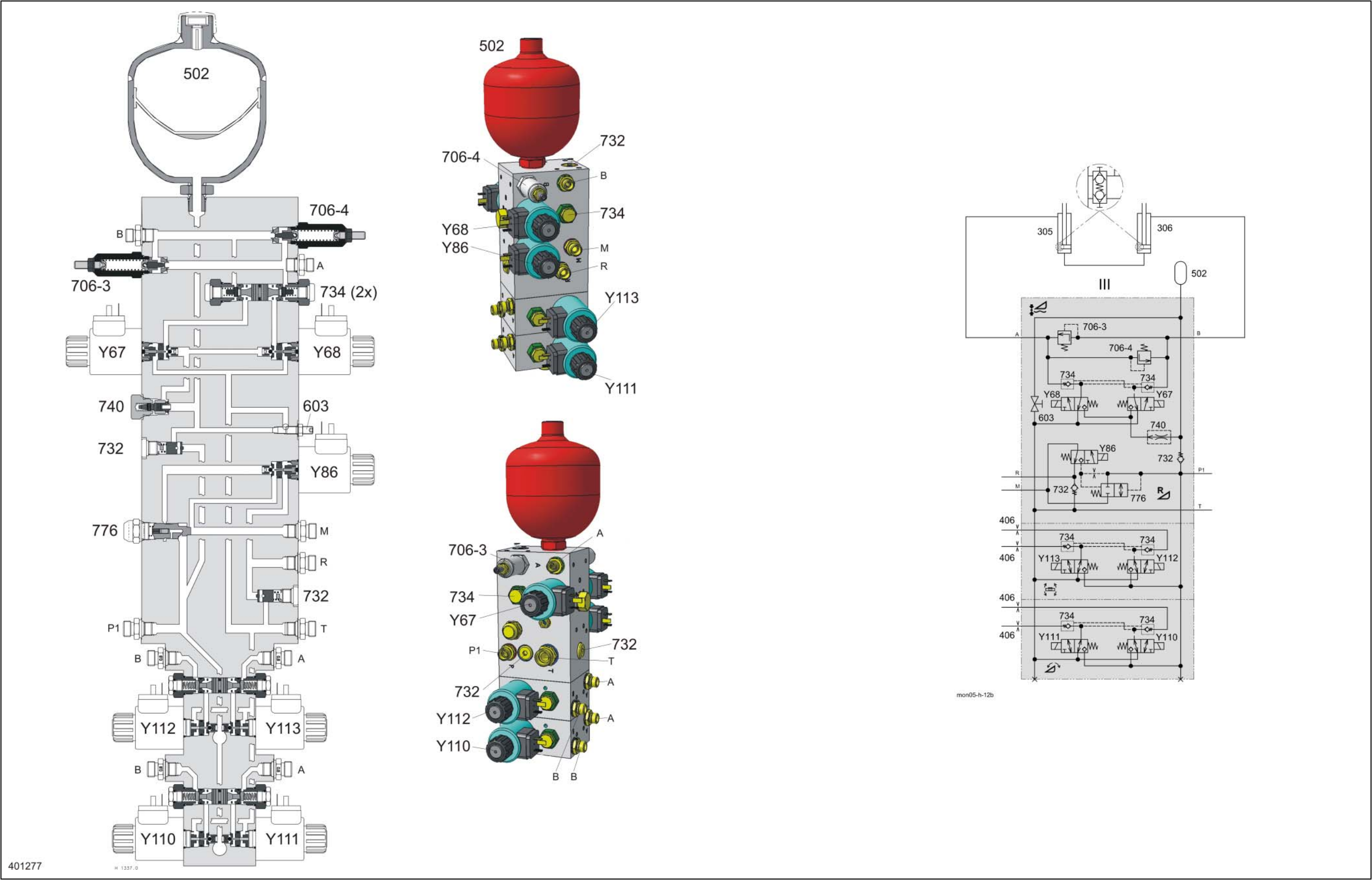
### **3.12.4**

#### **AUTO-CONTOUR (CAC) - Front attachment cross levelling**

LEXION Montana 570-520

from serial no. 58200052,  
58100038  
58000029

3.12.4 AUTO-CONTOUR (CAC) – Front attachment cross levelling -  
LEXION Montana from serial no. 582 00052, 581 00038, 580 00029  
4/3 way solenoid valve with accumulator and lock-up valve unit



**Key to diagram:**

305	AUTOCONTOUR cross levelling right hydraulic cylinder
306	AUTOCONTOUR cross levelling left hydraulic cylinder
406	Orifice plate F .....0.8 mm
502	AUTOCONTOUR / Cross levelling accumulator
603	AUTOCONTOUR / Cross levelling balance screw
706-3*	Cross levelling pressure relief valve (Montana).....200 bar
706-4*	Cross levelling pressure relief valve (Montana).....200 bar
732	Non-return valve
734	Lock-up valve unit (non-return valve)
740	AUTOCONTOUR cross levelling flow control valve
776	Reversing connecting valve
Y67	AUTOCONTOUR cross levelling left solenoid valve
Y68	AUTOCONTOUR cross levelling right solenoid valve
Y110	Raise cutting angle solenoid valve
Y111	Lower cutting angle solenoid valve
Y112	Rotate front attachment to the right solenoid valve
Y113	Rotate front attachment to the left solenoid valve

## III Autocontour / Reverse valve block

**Note:** When dismantling items 502, 732, 740, Y67 or Y68, the accumulator must be relieved at the pressure relief bolt (603) before.

**Description of function:****AUTOCONTOUR (CAC)**

As soon as the cutterbar is engaged, the CAC module (A8) actuates the master valve for approx. 1 sec. The pressure build-up within the system caused by the master valve pre-loads the accumulator (502) via the non-return valve (732).

The CAC module also actuates the master valve if the total actuated time of both solenoid valves (Y67/Y68) exceeds 10 seconds in order to pre-load the accumulator (502) again.

The pressure in this closed system is thus applied at the balls in the valve inserts of solenoid valves (Y67/Y68). The flow control valve (740) here has the task to ensure constant control movements of the cutterbar at different pressure values.

One of the solenoid valves (Y67/Y68) is actuated by the CAC module, depending on the required direction of rotation. The corresponding pilot spool opens the ball in the valve insert and closes the return line to the tank. The rising pressure builds up against the lock-up valve unit valve ram. The latter opens the non-return valve (734) at port A1 or A2.

The return line of a control cylinder is therefore connected with the tank via the valve insert of the unactuated solenoid valve (Y67/Y68). The pressure rising further opens the non-return valve (734) on the opposite port and the control cylinder in question is retracted while the other control cylinder is extended proportionally.

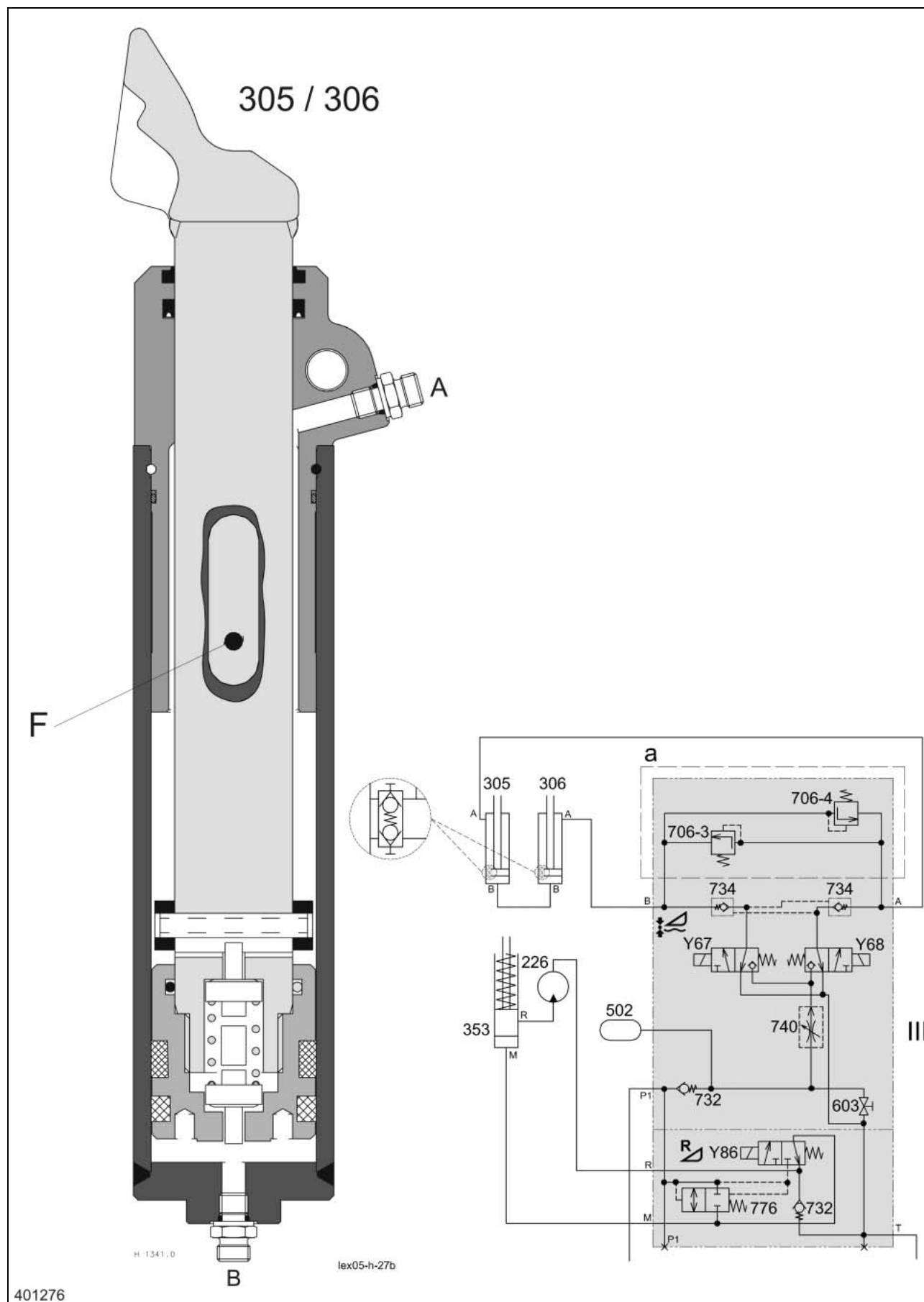
**Pressure limitation**

In addition to the standard machine features, the CAC cylinders (305/306) are protected against overload by the pressure relief valves (706-3 and 706-4).



**Notes:**

**AUTO-CONTOUR (CAC) – Front attachment cross levelling -**  
**LEXION Montana from serial no. 582 00052, 581 00038, 580 00029**  
 Hydraulic cylinder with bottom valves



**Key to diagram:**

305	AUTOCONTOUR cross levelling right hydraulic cylinder
306	AUTOCONTOUR cross levelling left hydraulic cylinder
406	Orifice plate F .....0.8 mm
502	AUTOCONTOUR / Cross levelling accumulator
603	AUTOCONTOUR / Cross levelling balance screw
706-3*	Cross levelling pressure relief valve (Montana).....200 bar
706-4*	Cross levelling pressure relief valve (Montana).....200 bar
732	Non-return valve
734	Lock-up valve unit (non-return valve)
740	AUTOCONTOUR cross levelling flow control valve
776	Reversing connecting valve
Y67	AUTOCONTOUR cross levelling left solenoid valve
Y68	AUTOCONTOUR cross levelling right solenoid valve
Y110	Raise cutting angle solenoid valve
Y111	Lower cutting angle solenoid valve
Y112	Rotate front attachment to the right solenoid valve
Y113	Rotate front attachment to the left solenoid valve

III Autocontour / Reverse valve block

**Note:** When dismantling items 502, 732, 740, Y67 or Y68, the accumulator must be relieved at the pressure relief bolt (603) before.

**Description of function:****Bottom valves**

The bottom valves (V) in master cylinder (315) are opened upon reaching the upper end stop position so that the slave cylinder can be filled and vented.

**Notes:**

## 3.13

### Reverse Front Attachment

<b>3.13.1</b>	<b>Reverse Front Attachment with AUTO-CONTOUR LEXION 580-510.....</b>	<b>3-150</b>
	3/2 way solenoid valve (pilot-controlled) .....	3-150
	Hydraulic cylinder .....	3-152
<b>3.13.2</b>	<b>Reverse Front Attachment without AUTO-CONTOUR.....</b>	<b>3-156</b>
	3/2 way solenoid valve (pilot-controlled) .....	3-156
	Hydraulic cylinder .....	3-158
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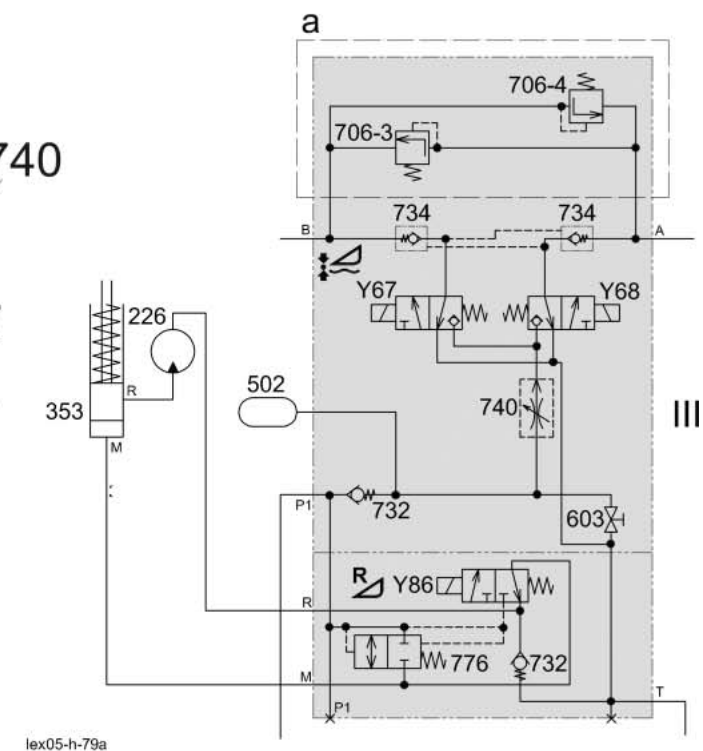
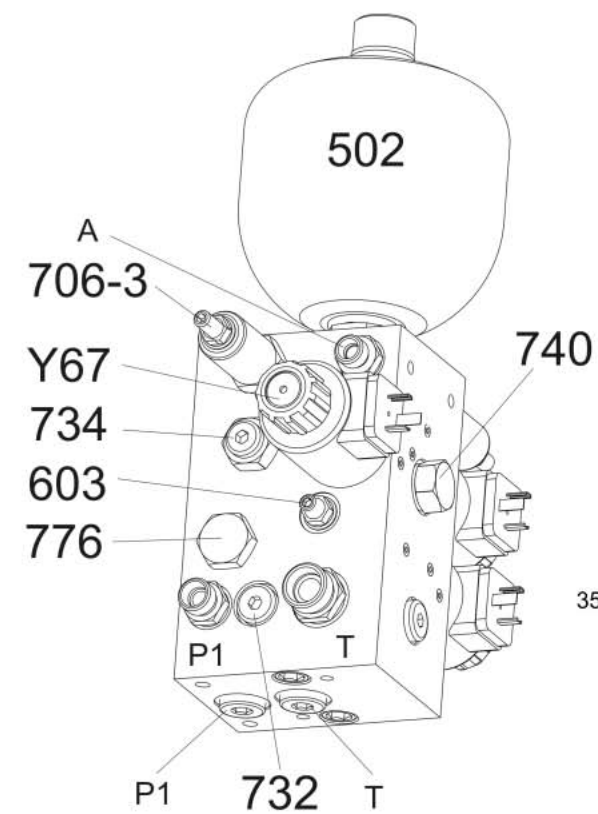
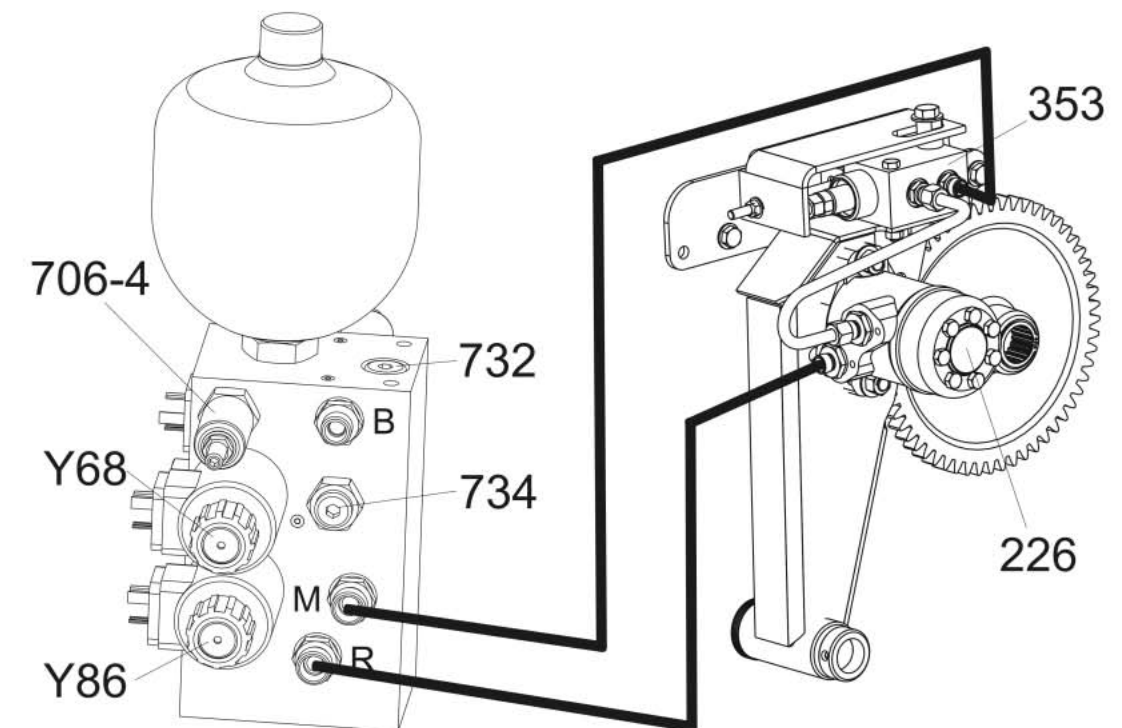
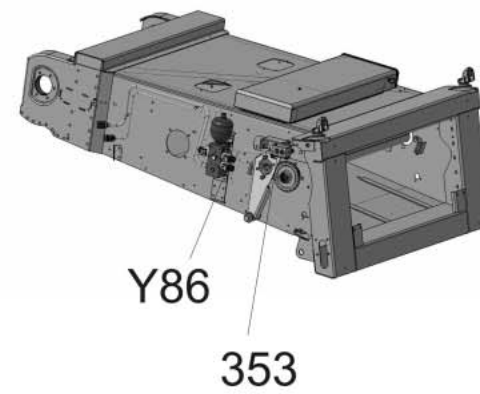
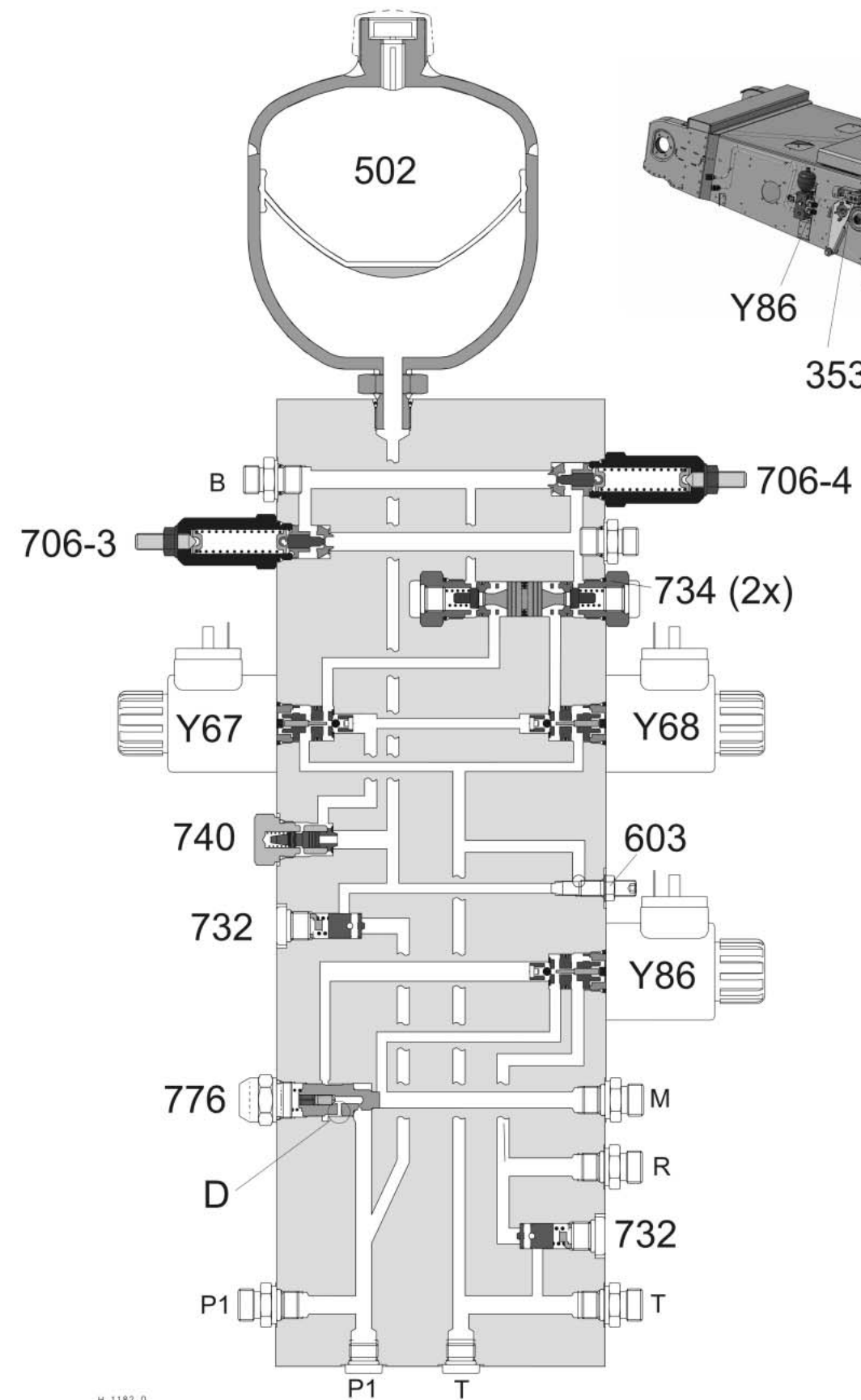


### **3.13.1**

#### **Reverse Front Attachment (with AUTO-CONTOUR)**

LEXION 580 - 510

### 3.13.1 Reverse Front Attachment with AUTO-CONTOUR LEXION 580-510





**Key to diagram:**

226	Front attachment reverser drive motor .....OMP 200
305	AUTOCONTOUR cross levelling right hydraulic cylinder
306	AUTOCONTOUR cross levelling left hydraulic cylinder
353	Reverse front attachment hydraulic cylinder
502	Cross levelling accumulator .....0.7 l / 80 bar
602	AUTOCONTOUR / Cross levelling shut-off valve
603	Pressure relief bolt
706-3*	Cross levelling pressure relief valve (Montana).....200 bar
706-4*	Cross levelling pressure relief valve (Montana).....200 bar
732	Non-return valve
734	Non-return valve (Lock-up valve unit)
740	Flow control valve
776	Reversing connecting valve (with restrictor)
Y67	Front attachment cross levelling left solenoid valve
Y68	Front attachment cross levelling right solenoid valve
Y86	Reverse front attachment solenoid valve
a	Option
D	Restrictor bore
T	Tank port
P1	Pump via master valve port
M	Front attachment reverse hydraulic cylinder port
R	Motor return line port
III	AUTOCONTOUR / Reverse valve block

**Note:** Prior to dismounting items 732, 502, 740, Y67 or Y68, the accumulator must be relieved at the pressure relief bolt (603).

**Description of function:****Neutral function**

The spring force displaces the oil from the reverser cylinder (353) via the connection from M to T inside the solenoid valve (Y86) to the tank. During this process, port (P1) is closed.

**Reversing function**

The solenoid valve (Y86) and the master valve (Y77) are actuated at the same time. During this, the return line to the tank is closed by solenoid valve (Y86) and the restrictor bore (D) provides the connection from (P) to the consumer port (M).

When actuating the front attachment reverse solenoid valve (Y86), the restrictor bore (D) creates a differential pressure at the reversing connecting valve (776) which in turn opens valve (776).

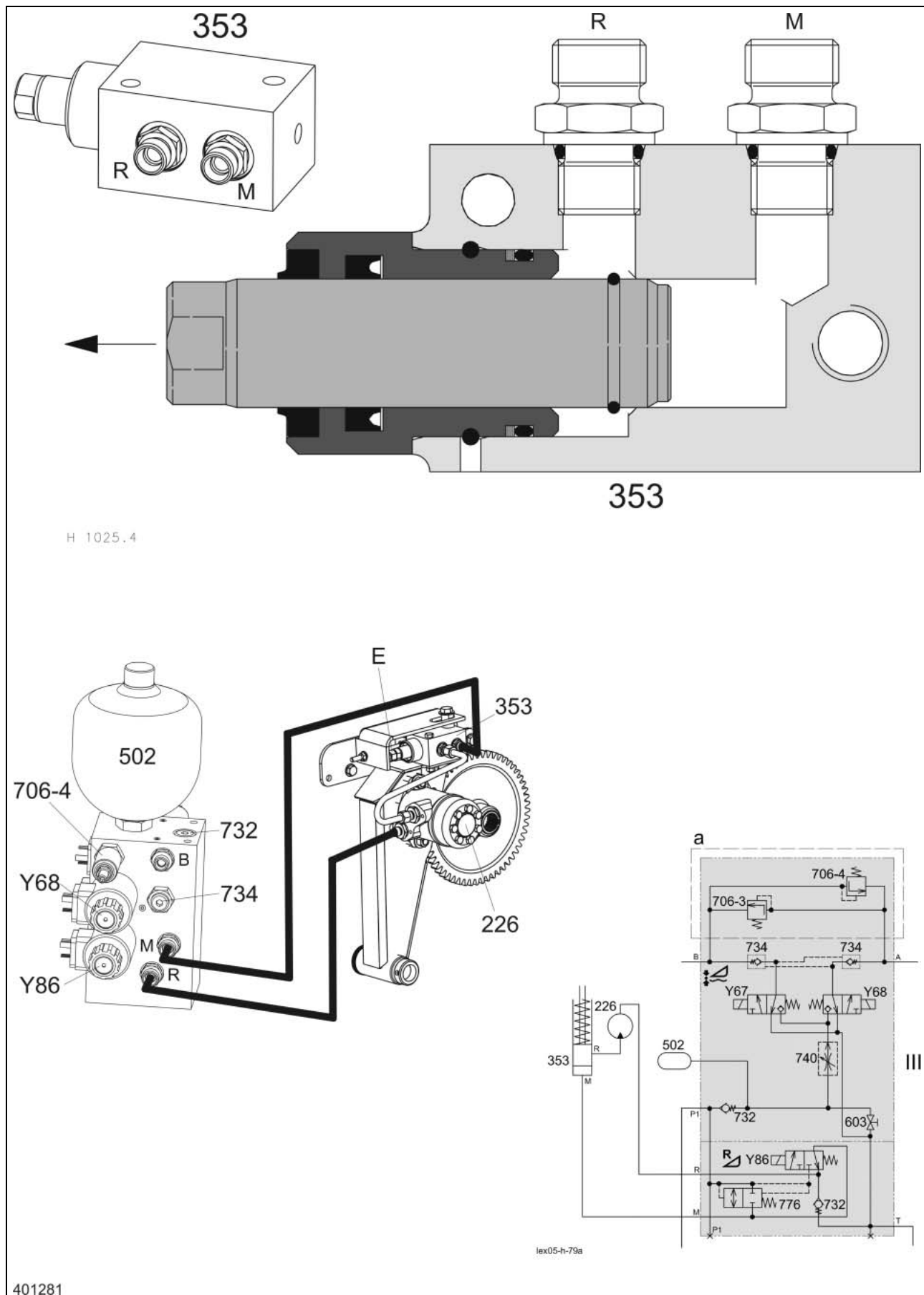
A notch in the main ram of reversing connecting valve (776) ensures a smooth start of the reversing process.

The reversing cylinder (353) extends and swings the hydraulic motor (226) to the drive gearwheel. Just before reaching the end position, the volume flow to the hydraulic motor (226) is released, ensuring reliable gearwheel engaging.

The non-return valve (732) keeps the hydraulic motor (226) from starting due to pressure peaks occurring in the return line.

**Reverse front attachment****LEXION 580 - 510 up to serial no. 58600336, 58500162, 58400895, 58300298**

Hydraulic cylinder



**Key to diagram:**

226	Front attachment reverser drive motor .....OMP 200
353	Reverse front attachment hydraulic cylinder
502	AUTOCONTOUR / Cross levelling accumulator
706-3*	Cross levelling pressure relief valve (Montana) .....200 bar
706-4*	Cross levelling pressure relief valve (Montana) .....200 bar
732	Non-return valve
734	Lock-up valve unit (non-return valve)
776	Reversing connecting valve (with restrictor)
Y68	AUTOCONTOUR cross levelling right solenoid valve
Y86	Reverse front attachment solenoid valve
III	AUTOCONTOUR / Reverse valve block
a	Option
E	Setscrew
T	Tank port
P	Pump via master valve port
M	Front attachment reverse hydraulic cylinder port
R	Motor return line port

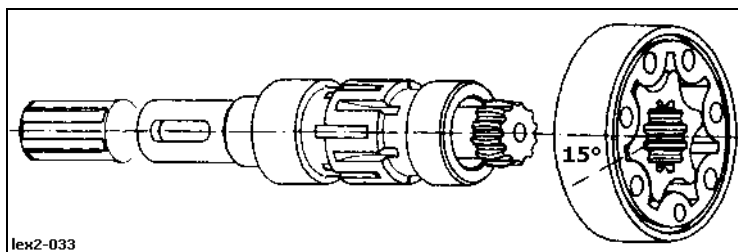
**Description of function:****Reversing**

When the solenoid valve (Y86) is actuated, the reversing cylinder (353) extends and swings the hydraulic motor (226) to the drive gearwheel. Just before reaching its end position, the oil flow from the reversing cylinder (353) to the hydraulic motor (226) is released, ensuring reliable gearwheel engaging.

The non-return valve (732) keeps the hydraulic motor (226) from starting when pressure peaks occur in the return line.

**Adjustment**

The reverser support is aligned towards the feed rake conveyor drive shaft by adjusting an eccentric bushing on the reverser cylinder (353). The piston stroke is adjusted using the set screw (E). With the reverser swung in, the set screw (E) must have a play of **0.5 mm** from the end stop, then jam the set screw (E).

**Installation position of reverser motor OMP 200**

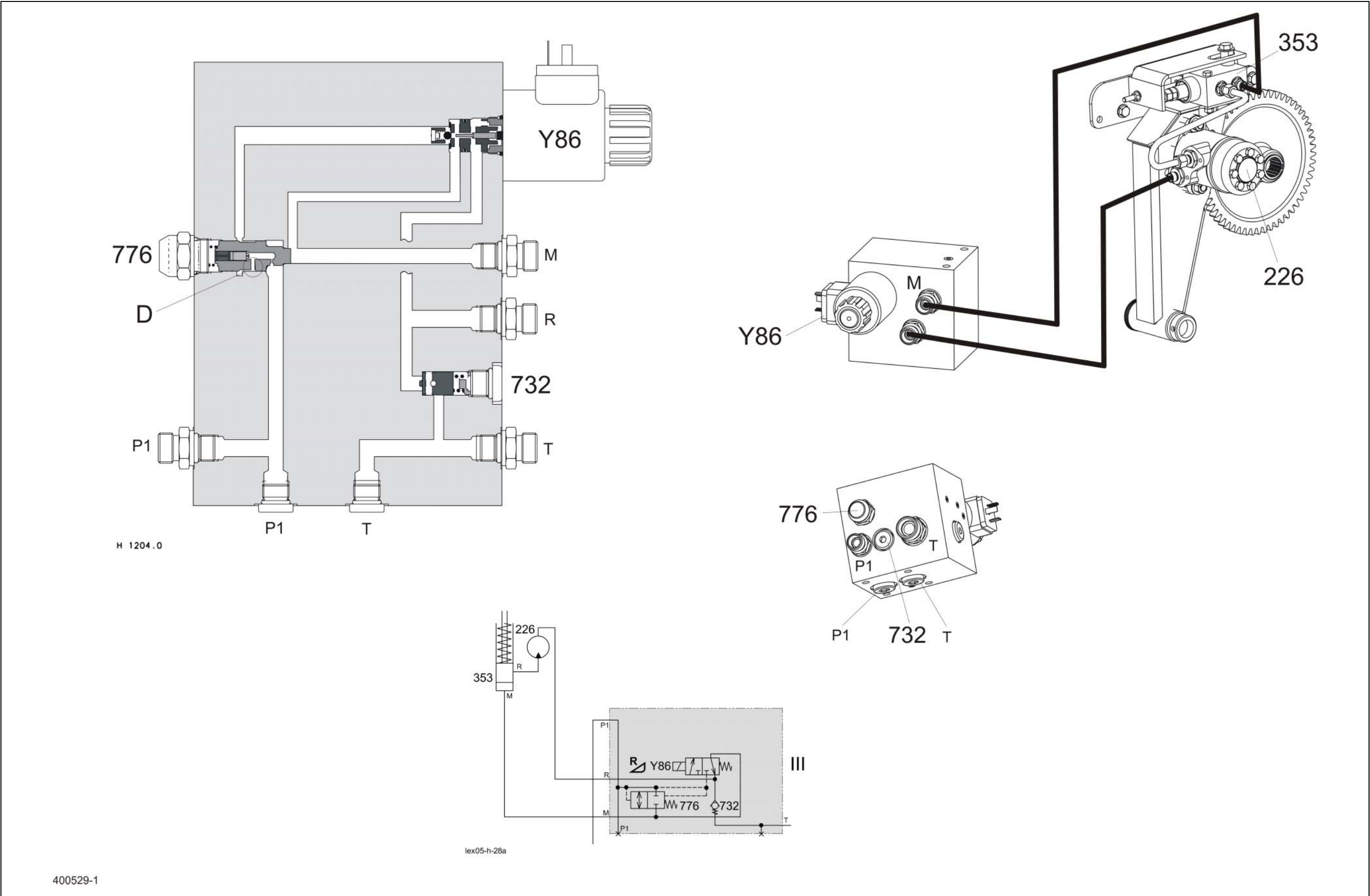
**Notes:**

### **3.13.2**

#### **Reverse Front Attachment (without AUTO-CONTOUR)**

LEXION 580 - 510

3.13.2 Reverse Front Attachment without AUTO-CONTOUR  
3/2 way solenoid valve (pilot-controlled)



**Key to diagram:**

226	Front attachment reverser drive motor ..... OMP 200
353	Reverse front attachment hydraulic cylinder
732	Non-return valve
776	Reversing connecting valve (with restrictor)
Y86	Reverse front attachment solenoid valve
D	Restrictor bore
T	Tank port
P1	Pump via master valve port
M	Front attachment reverse hydraulic cylinder port
R	Motor return line port
III	AUTOCONTOUR / Reverse valve block

**Description of function:****Neutral function**

The spring force displaces the oil from the reverser cylinder (353) via the connection from M to T inside the solenoid valve (Y86) to the tank. During this process, port P is closed.

**Reversing function**

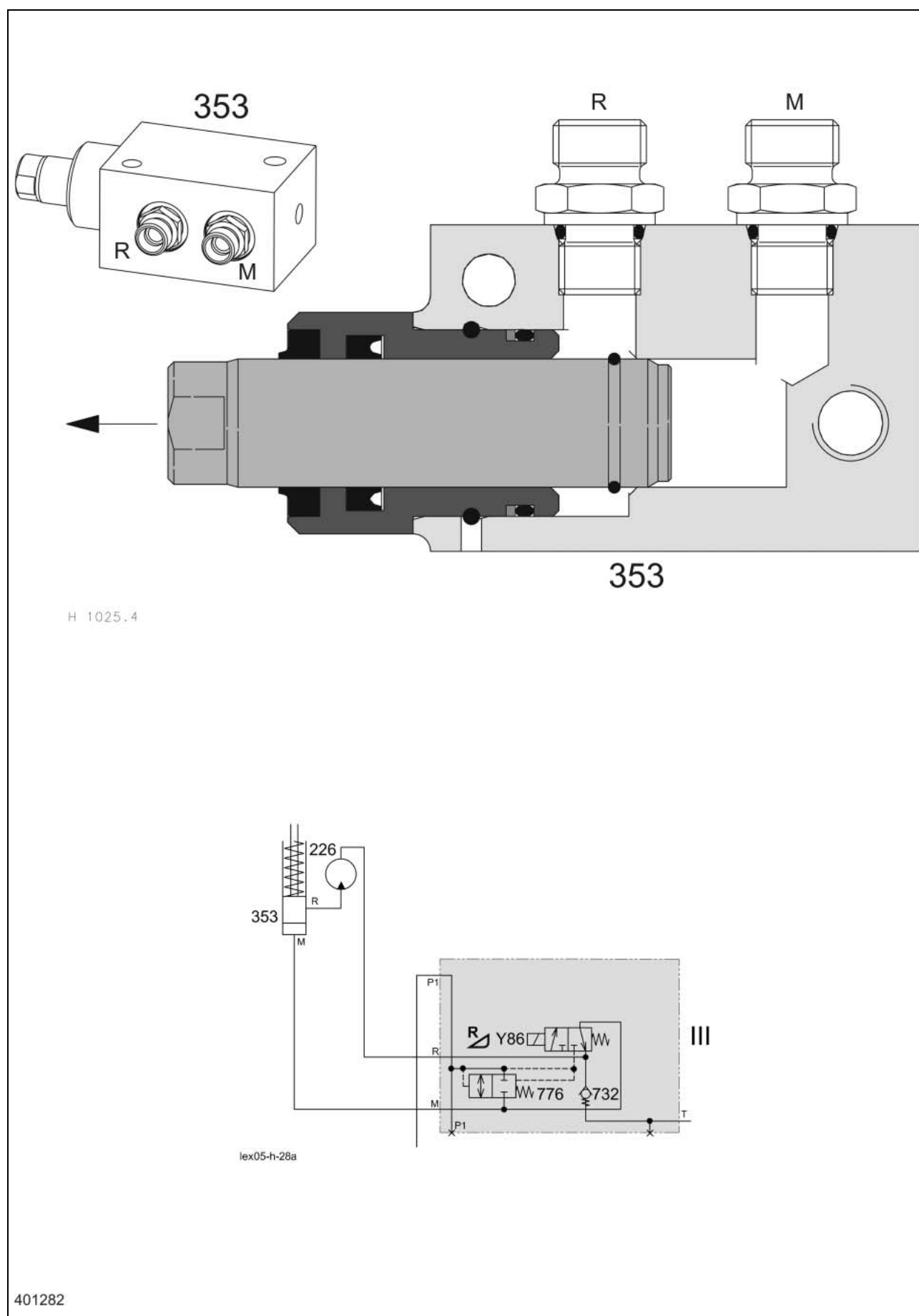
The solenoid valve (Y86) and the master valve (Y77) are actuated at the same time. During this, the return line to the tank is closed by solenoid valve (Y86) and the restrictor bore (D) provides the connection from (P) to the consumer port (M).

When actuating the front attachment reverse solenoid valve (Y86), the restrictor bore (D) creates a differential pressure at the reversing connecting valve (776) which in turn opens valve (776).

A notch in the main ram of reversing connecting valve (776) ensures a smooth start of the reversing process.

The reversing cylinder (353) extends and swings the hydraulic motor (226) to the drive gearwheel. Just before reaching the end position, the volume flow to the hydraulic motor (226) is released, ensuring reliable gearwheel engaging.

The non-return valve (732) keeps the hydraulic motor (226) from starting due to pressure peaks occurring in the return line.

**Reverse Front Attachment**  
Hydraulic cylinder



**Key to diagram:**

226	Front attachment reverser drive motor.....OMP 200
353	Reverse front attachment hydraulic cylinder
732	Non-return valve
734	Lock-up valve unit (non-return valve)
776	Reversing connecting valve (with restrictor)
Y86	Reverse front attachment solenoid valve
T	Tank port
P1	Pump via master valve port
M	Front attachment reverse hydraulic cylinder port
R	Motor return line port
III	Reversing

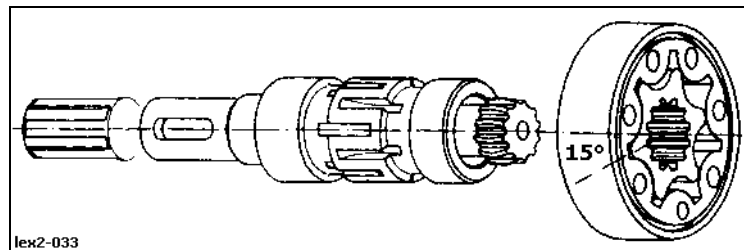
**Description of function:****Reversing**

When the solenoid valve (Y86) is actuated, the reversing cylinder (353) extends and swings the hydraulic motor (226) to the drive gearwheel. Just before reaching its end position, the oil flow from the reversing cylinder (353) to the hydraulic motor (226) is released, ensuring reliable gearwheel engaging.

The non-return valve (732) keeps the hydraulic motor (226) from starting when pressure peaks occur in the return line.

**Adjustment**

The reverser support is aligned towards the feed rake conveyor drive shaft by adjusting an eccentric bushing on the reverser cylinder (353). The piston stroke is adjusted using the set screw (E). With the reverser swung in, the set screw (E) must have a play of **0.5 mm** from the end stop, then jam the set screw (E).

**Installation position of reverser motor OMP 200**

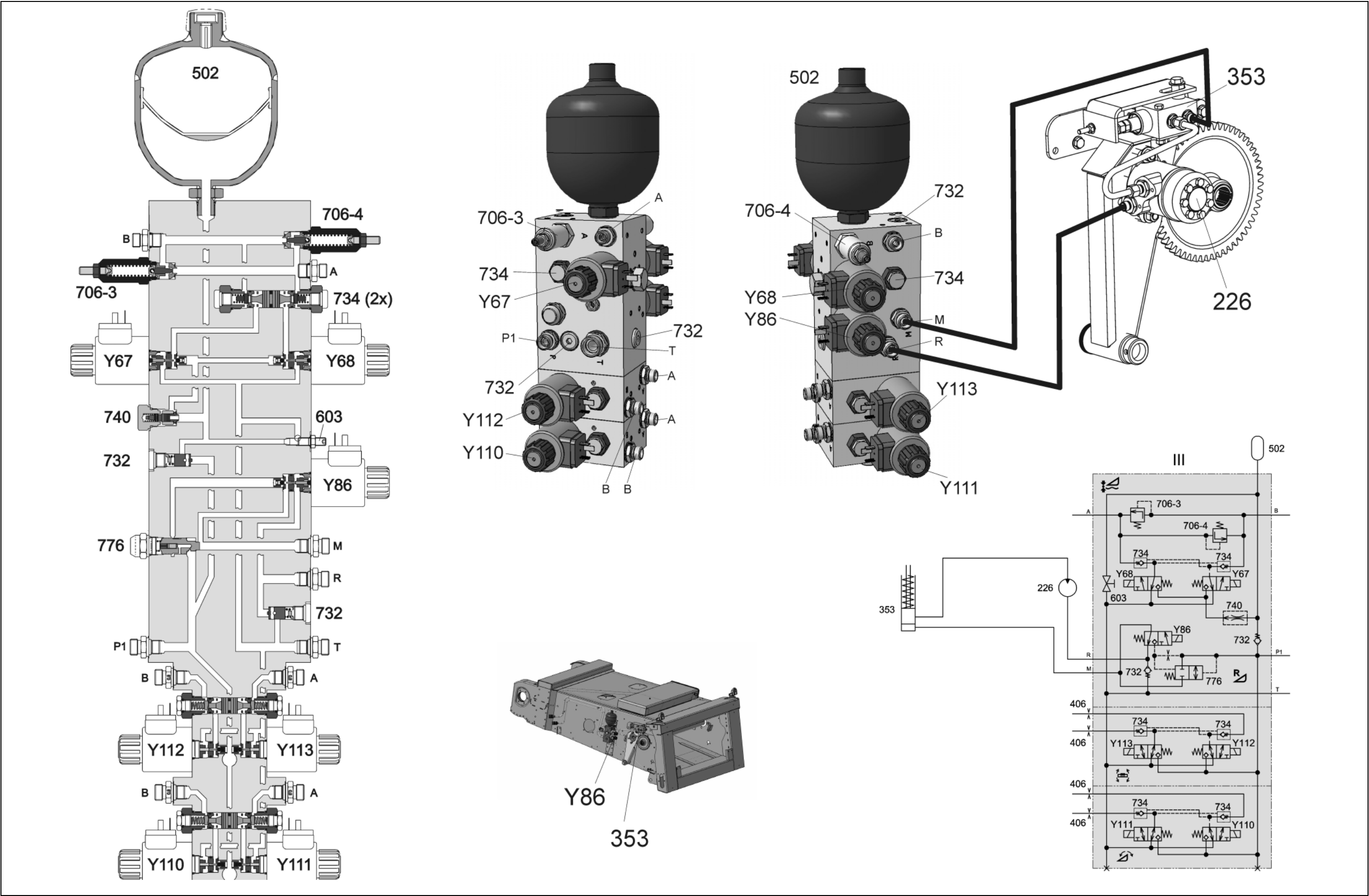
**Notes:**

### **3.13.3**

#### **Reverse front attachment**

LEXION Montana 570-520

3.13.3 Reverse front attachment - LEXION Montana 570-520  
3/2 way solenoid valve



**Key to diagram:**

226	Front attachment reverser drive motor
305	AUTOCONTOUR cross levelling right hydraulic cylinder
306	AUTOCONTOUR cross levelling left hydraulic cylinder
353	Reverse front attachment hydraulic cylinder
364	Rotate front attachment frame hydraulic cylinder
367	Cutting angle adjustment hydraulic cylinder
406	Orifice plate F .....0.8 mm
502	AUTOCONTOUR / Cross levelling accumulator 0.75 l / 80 bar
602	AUTOCONTOUR / Cross levelling shut-off valve
603	AUTOCONTOUR / Cross levelling balance screw
614	Front attachment lower flow control valve
706-3*	Cross levelling pressure relief valve (Montana) .....200 bar
706-4*	Cross levelling pressure relief valve (Montana) .....200 bar
732	Non-return valve
734	Lock-up valve unit (non-return valve)
740	AUTOCONTOUR cross levelling flow control valve
776	Reversing connecting valve
Y67	AUTOCONTOUR cross levelling left solenoid valve
Y68	AUTOCONTOUR cross levelling right solenoid valve
Y110	Raise cutting angle solenoid valve
Y111	Lower cutting angle solenoid valve
Y112	Rotate front attachment to the right solenoid valve
Y113	Rotate front attachment to the left solenoid valve
III	Autocontour / Reverse valve block

**Note:** When dismantling items 502, 732, 740, Y67 or Y68, the accumulator must be relieved at the pressure relief bolt (603) before.

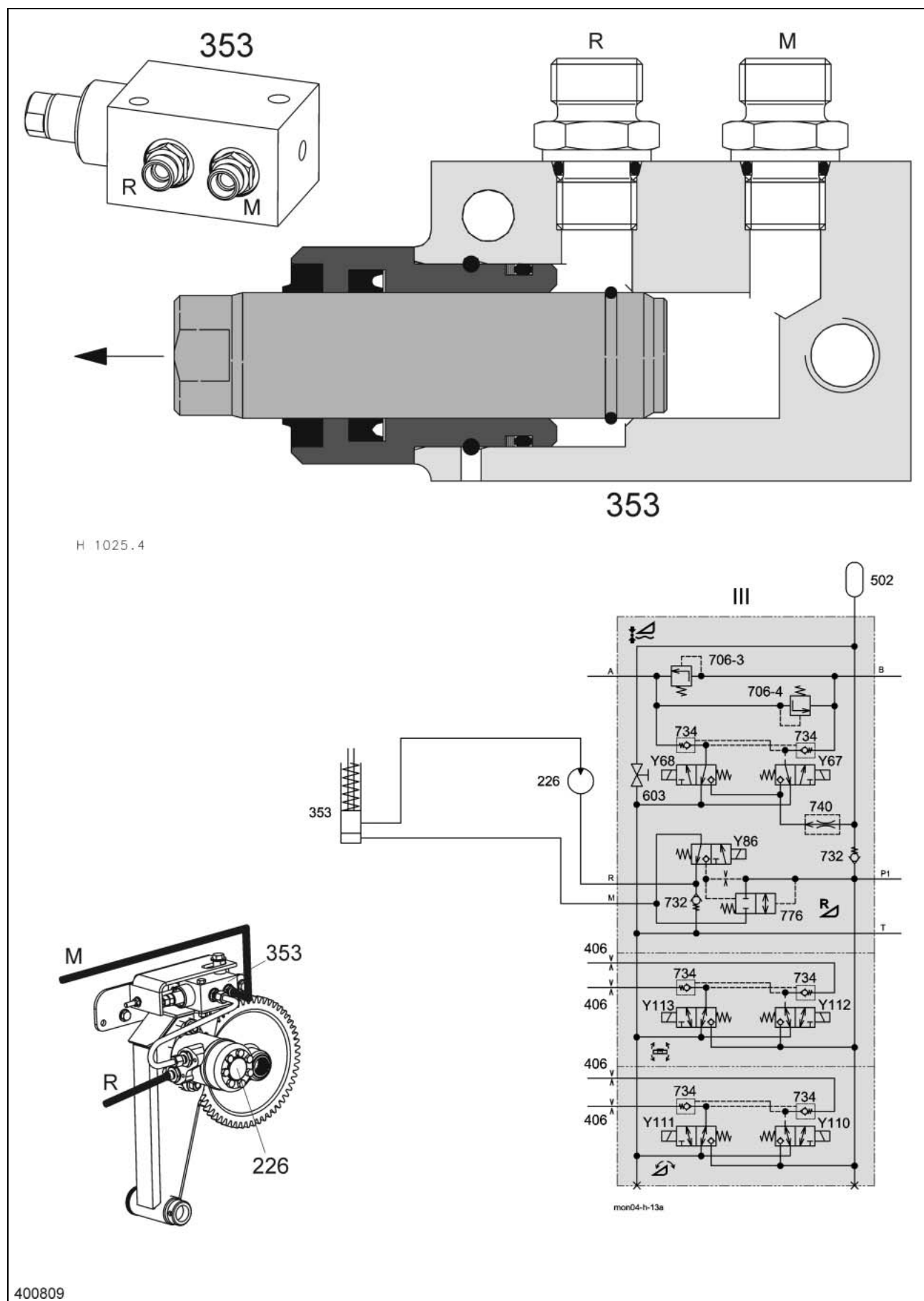
**Description of function:**

Neutral function	<p>The spring force displaces the oil from the reverser cylinder (353) via the connection from M to T inside the solenoid valve (Y86) to the tank. During this process, port (P1) is closed.</p>
Reversing function	<p>The solenoid valve (Y86) and the master valve (Y77) are actuated at the same time. During this, the return line to the tank is closed by solenoid valve (Y86) and the restrictor bore (D) provides the connection from (P) to the consumer port (M).</p> <p>When actuating the front attachment reverse solenoid valve (Y86), the restrictor bore (D) creates a differential pressure at the reversing connecting valve (776) which in turn opens valve (776).</p> <p>A notch in the main ram of reversing connecting valve (776) ensures a smooth start of the reversing process.</p> <p>The reversing cylinder (353) extends and swings the hydraulic motor (226) to the drive gearwheel. Just before reaching the end position, the volume flow to the hydraulic motor (226) is released, ensuring reliable gearwheel engaging.</p> <p>The non-return valve (732) keeps the hydraulic motor (226) from starting due to pressure peaks occurring in the return line.</p>

**Notes:**

# Reverse front attachment

## Hydraulic cylinders





**Key to diagram:**

226	Front attachment reverser drive motor
305	AUTOCONTOUR cross levelling right hydraulic cylinder
306	AUTOCONTOUR cross levelling left hydraulic cylinder
353	Reverse front attachment hydraulic cylinder
364	Rotate front attachment frame hydraulic cylinder
367	Cutting angle adjustment hydraulic cylinder
406	Orifice plate F .....0.8 mm
502	AUTOCONTOUR / Cross levelling accumulator 0.75 l / 80 bar
602	AUTOCONTOUR / Cross levelling shut-off valve
603	AUTOCONTOUR / Cross levelling balance screw
614	Front attachment lower flow control valve
706-3*	Cross levelling pressure relief valve (Montana) .....200 bar
706-4*	Cross levelling pressure relief valve (Montana) .....200 bar
732	Non-return valve
734	Lock-up valve unit (non-return valve)
740	AUTOCONTOUR cross levelling flow control valve
776	Reversing connecting valve
Y67	AUTOCONTOUR cross levelling left solenoid valve
Y68	AUTOCONTOUR cross levelling right solenoid valve
Y110	Raise cutting angle solenoid valve
Y111	Lower cutting angle solenoid valve
Y112	Rotate front attachment to the right solenoid valve
Y113	Rotate front attachment to the left solenoid valve
III	Autocontour / Reverse valve block

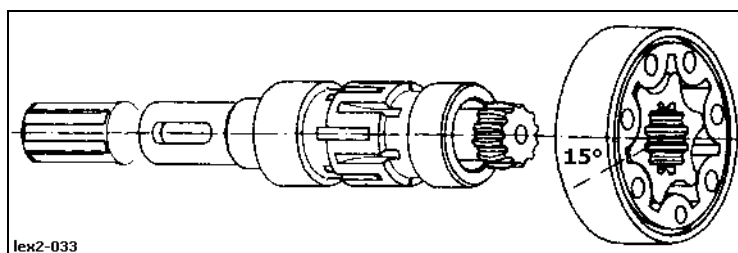
**Description of function:****Reversing**

When the solenoid valve (Y86) is actuated, the reversing cylinder (353) extends and swings the hydraulic motor (226) to the drive gearwheel. Just before reaching its end position, the oil flow from the reversing cylinder (353) to the hydraulic motor (226) is released. This ensures reliable engaging of the gearwheels for the reversing process.

The non-return valve (732) keeps the hydraulic motor (226) from starting when pressure peaks occur in the return line.

**Adjustment**

The reverser support is aligned towards the feed rake conveyor drive shaft by adjusting an eccentric bushing on the reverser cylinder (353). The piston stroke is adjusted using the set screw (E). With the reverser swung in, the set screw (E) must have a play of **0.5 mm** from the end stop, then jam the set screw (E).

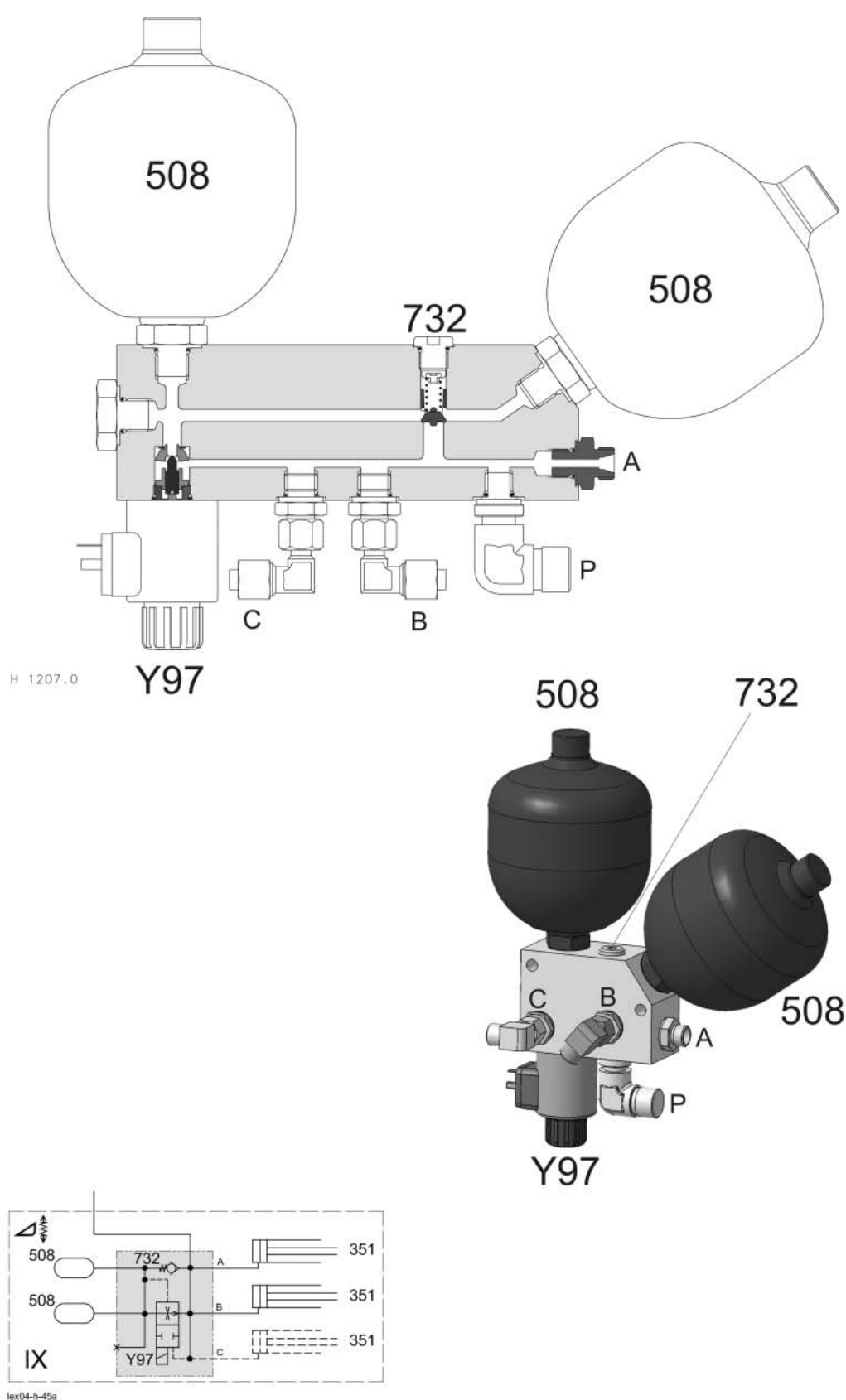
**Installation position of  
reverser motor OMP 200**

## 3.14

### Front Attachment Dampening

3.14.1	Front Attachment Dampening .....	3-170
	2/2 way solenoid valve .....	3-170

### 3.14.1 Front Attachment Dampening 2/2 way solenoid valve



400532

**Key to diagram:**

351	Raise/lower front attachment hydraulic cylinder
508	Accumulator ..... 0.6 l
707	Pressure holding valve (non-return valve)
732	Non-return valve
Y97	Front attachment dampening solenoid valve
A	Consumer port
B	Consumer port
C	Consumer port
P	Pump port
IX	Front attachment dampening valve block

**Description of function:**

When the front attachment dampening solenoid valve (Y97) is **not actuated**, cutterbar dampening is **active**.  
Pressure peaks are compensated by the accumulators (508).

However, reliable cutterbar function can be ensured only when cutterbar dampening is blocked - Front attachment dampening solenoid valve (Y97) actuated.

The front attachment dampening solenoid valve (Y97) can be actuated only if  
**the threshing mechanism is engaged and**  
**the front attachment is engaged and**  
**full throttle and**  
**the working position has been reached.**



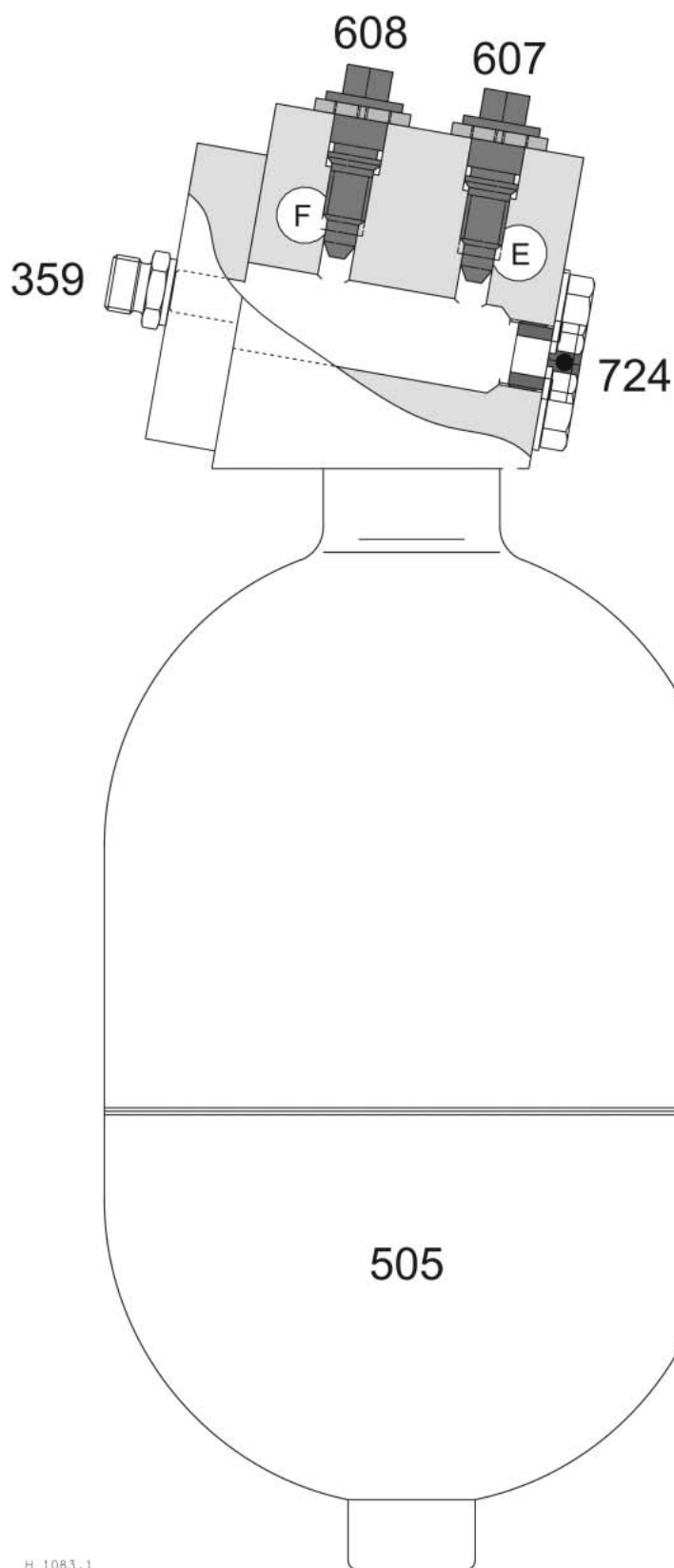
## 3.15

### Half-tracks Tension

<b>3.15.1</b>	<b>Half tracks Tension .....</b>	<b>3-174</b>
	Valve manifold block with filling device and safety function .....	3-174

**3.15.1 Half tracks Tension**

Valve manifold block with filling device and safety function



400508



**Key to diagram:**

359	Rubber track tension hydraulic cylinder	
505	Accumulator .....	3.5 l / 100 bar
607	Venting valve	
608	Filling valve	
724	Safety valve (rupture disc)	
E	Vent hose connection	
F	Filling hose connection	

**Description of function:**

## Filling instructions

1. Connect filling hose with the quick release coupling installed in parallel with the hydraulic cylinder of the threshing drum variator.
2. Connect the other end of the filling hose with the filling connection (F) at the half-track valve block.
3. Open venting valve (607) by approx. a quarter to a half turn and hold drain hose into a suitable container.
4. Start diesel engine and engage threshing mechanism.
5. Actuate threshing drum speed increase and open filling valve (608) slowly until the oil comes out of the drain hose connected to the vent valve (607) without bubbles.
6. Close vent valve (607).
7. Actuate the threshing drum speed increase for **approx. 50 sec.** The pressure indicated on the pressure gauge of the filling hose must be stable at **approx. 150 bar.**
8. Close filling valve (608).
9. Stop diesel engine and remove filling hose.

## Safety function

If the pressure in the system rises disproportionately due to a sudden mechanical load on the track roller unit, a rupture disc (724) provided in the valve block acts as a safety valve. This disc (724) bursts in case of excess pressure and the oil contained in the system leaks out of the valve block at this point.  
The destroyed rupture disc (724) must be replaced by a new one during the repair.



**4****Low-pressure  
Hydraulic System**

<b>4.1</b>	<b>Low-pressure Hydraulic System LEXION 580-510 .....</b>	<b>4-3</b>
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## 4.1

### Low-pressure Hydraulic System LEXION 580-510

4.1.1	Low-pressure Hydraulic System Diagram LEXION 580-510 .....	4-6
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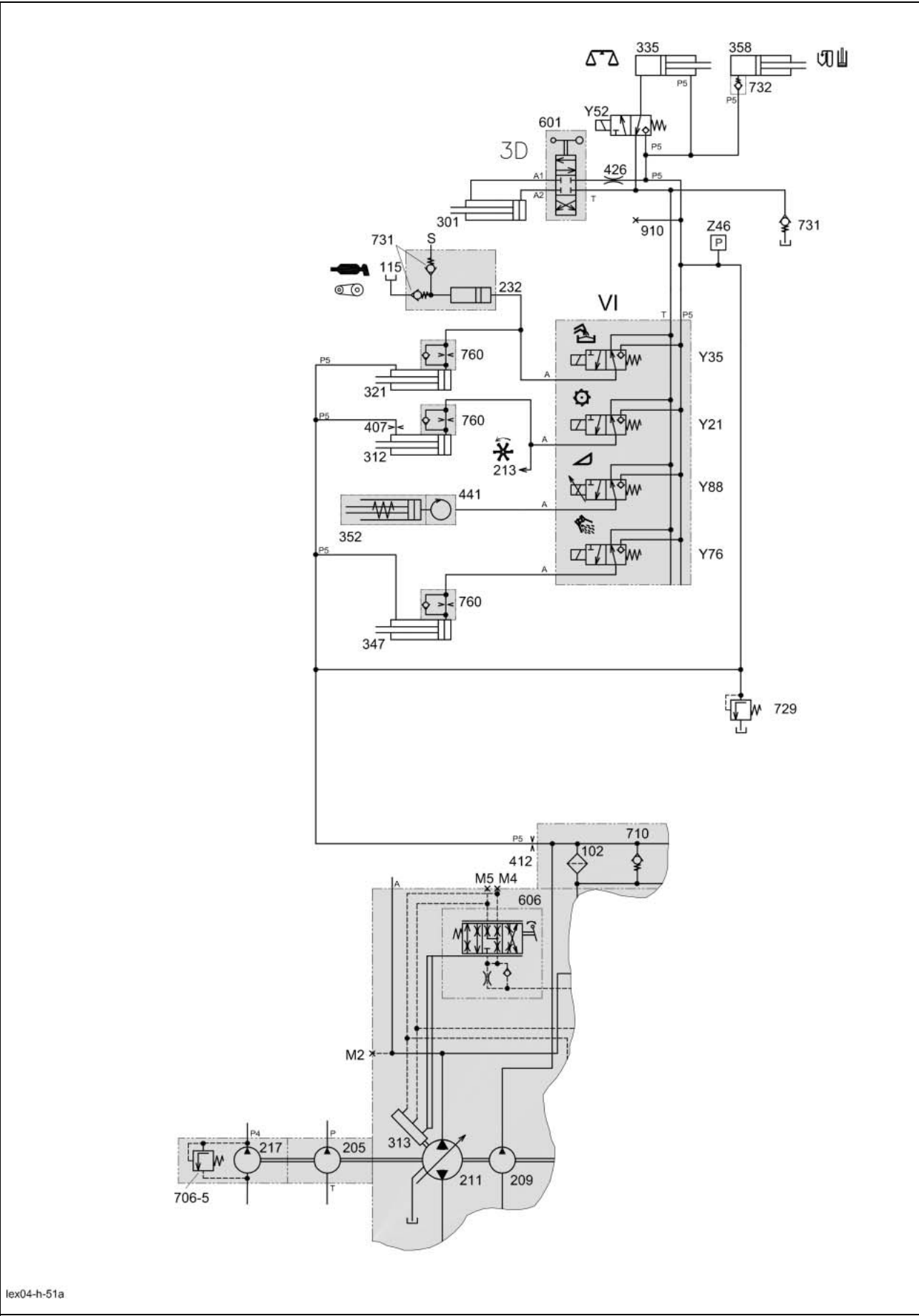


#### **4.1.1**

### **Low-pressure Hydraulic System Diagram**

LEXION 580-510

4.1.1 Low-pressure Hydraulic System Diagram LEXION 580-510



- Key to diagram:
- 102

115

205

209

211

213

217

232

301

312

313

321

335

339

347

352

358

407

412

426

441

601

606

706-5

710

715

729

731

732

748

760

910

Y21

Y35

Y52

Y76

Y88

Z46

A

T

P

P4

P5

S

M2

M4

M5

VI

Pressure filter

Grain tank unloading lubricant reservoir

Working hydraulics gear pump ..... 14 / 19 cm<sup>3</sup>/U

Ground drive feed pump ..... 20 / 26 cm<sup>3</sup>/U

Ground drive

variable-displacement pump ..... 100 / 130 cm<sup>3</sup>/rev.

Reel drive pump ..... 15 cm<sup>3</sup>/rev.

Rotary chaff screen pump ..... 5.5 cm<sup>3</sup>/rev.

Grain tank unloading lubricant pump

3-D sieve pan hydraulic cylinder

Threshing mechanism coupling hydraulic cylinder

Ground drive pump servo control hydraulic cylinder

Grain tank unloading hydraulic cylinder

Sample gate hydraulic cylinder (moisture measurement)

Servo gearshift hydraulic cylinder

Straw chopper clutch hydraulic cylinder

Front attachment clutch hydraulic cylinder

Grain elevator chain tension hydraulic cylinder

Orifice plate G ..... Ø 1 mm

Orifice plate M ..... Ø 2 mm

Hollow screw with restrictor bore ..... Ø 0.8 mm

Rotary coupling

3-D sieve pan pendulum control valve

Ground drive servo control hydraulic valve

Pressure relief valve ..... 100±5 bar

Ground drive filter bypass valve

Servo gearshift short-circuit valve

Pressure relief valve ..... 19<sup>+4</sup> bar

Non-return valve

Non-return valve

One-way restrictor valve ..... Ø 0.8 mm

One-way restrictor, one-sided

Measuring port

Threshing mechanism clutch engage solenoid valve

Grain tank unloading solenoid valve

Sample gate solenoid valve (moisture measurement)

Straw chopper clutch solenoid valve

Front attachment clutch solenoid valve (proportional)

Oil pressure switch ..... 12 bar

Consumer port

Tank port

Ground drive feed pump port

Rotary chaff screen port

Low-pressure port

Grain tank unloading lubricant brush port

High pressure backward measuring port

Actuating pressure backward measuring port

Actuating pressure forward measuring port

Low-pressure hydraulics valve block

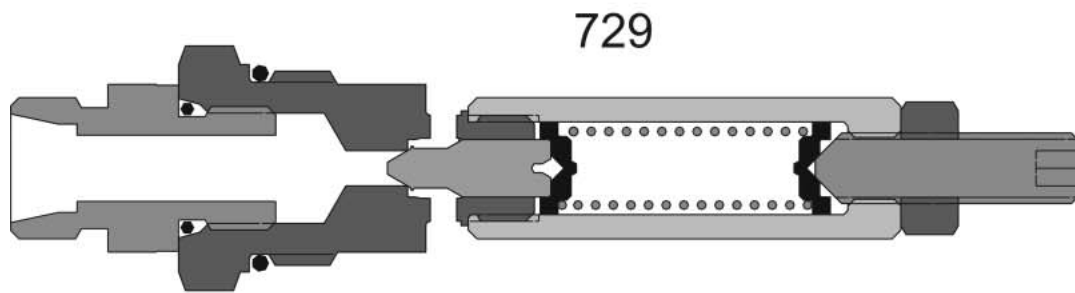


**Malfunctions:**

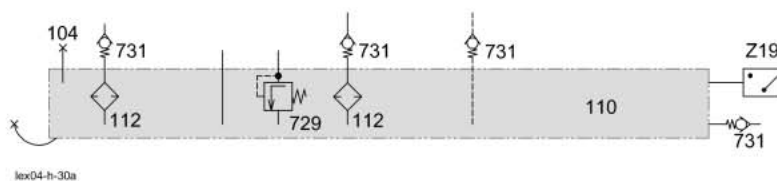
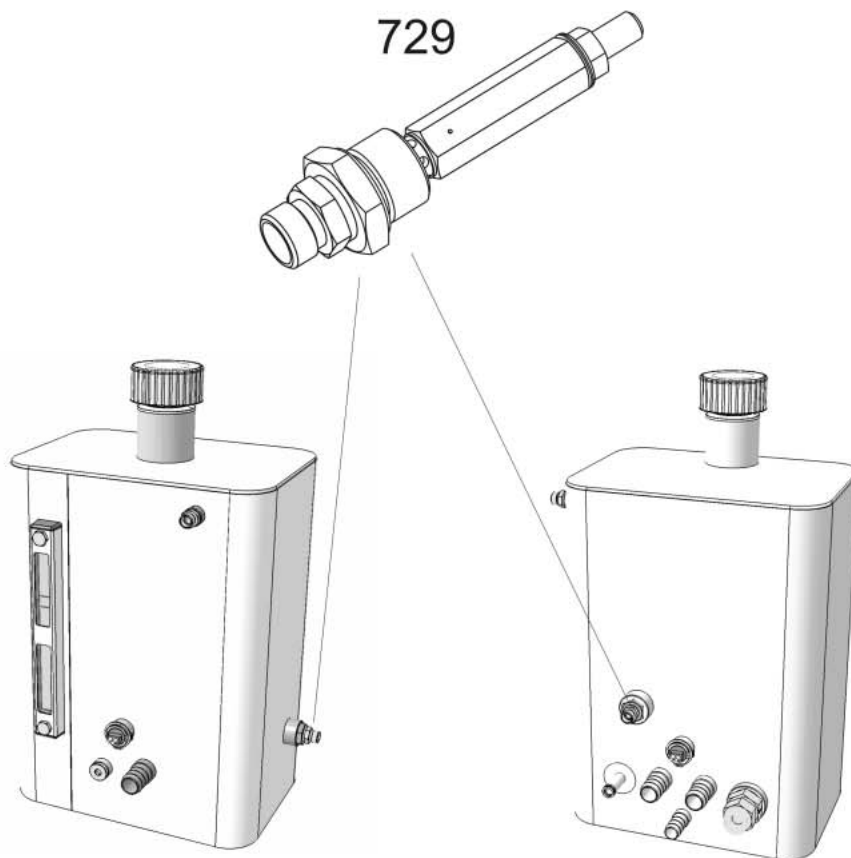
When there are malfunctions in the low-pressure hydraulic system, only consumers which have been shut-down can cause a pressure drop in the system. In this way, the reason of a malfunction can be quickly determined by shutting down individual functions while keeping a pressure gauge connected (measuring port 910).

**Note:** Oil supply of the low-pressure hydraulic system is ensured by the ground drive feed pump (209).  
The orifice plate (412) limits the volume flow to the low-pressure hydraulic system to **5-7 l/min** at the rated pressure ( $19^{+4}$  bar). This ensures that the feed pressure for the hydrostatic ground drive will not collapse even in case of large leaks in the low-pressure hydraulic system.

#### 4.1.2 Pressure Relief Valve Of Low-pressure Hydraulic System



H 1198.0



400510

**Key to diagram:**

104	Vent opening
110	Oil tank
112	Return filter
729	Pressure relief valve ..... 19 <sup>+4</sup> bar
731	Non-return valve
Z19	Hydraulic oil level actual value switch (min.)
T	Tank port
P	Ground drive feed pump port

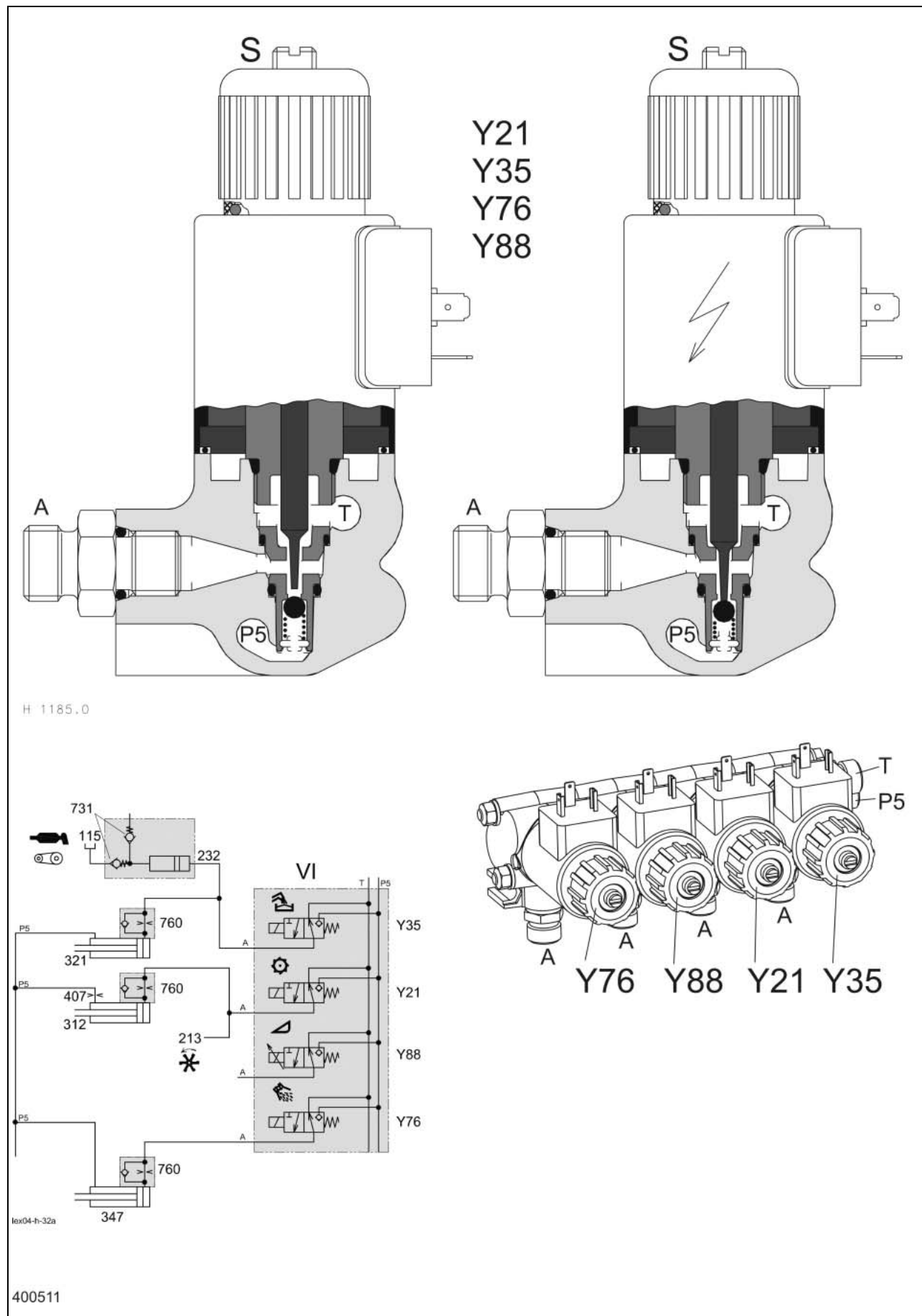
**Description of function:**

## Pressure relief valve

The pressure relief valve (729) limits the pressure in the low-pressure hydraulic system and thus protects the connected mechanical components against damage due to excessive forces.  
The spring in the pressure relief valve (703) is pre-stressed for a system pressure of 19<sup>+4</sup> bar.

## 4.1.3 Low-pressure Hydraulic System Solenoid Valves

3/2 way valve



**Key to diagram:**

115	Grain tank unloading lubricant reservoir
213	Reel drive pump ..... 15 cm <sup>3</sup> /rev.
312	Threshing mechanism coupling hydraulic cylinder
321	Grain tank unloading hydraulic cylinder
232	Grain tank unloading lubricant pump
347	Straw chopper clutch hydraulic cylinder
407	Orifice plate G ..... Ø 1 mm
731	Non-return valve
760	One-way restrictor, one-sided
Y21	Threshing mechanism clutch engage solenoid valve
Y35	Grain tank unloading solenoid valve
Y76	Straw chopper clutch solenoid valve
Y88	Front attachment clutch solenoid valve (proportional)
T	Tank port
P5	Ground drive feed pump port
A	Hydraulic cylinder port
S	Emergency operation screw
VI	Low-pressure hydraulics valve block

**Description of function:****Front attachment clutch**

With the front attachment clutch solenoid valve (Y88) disengaged, port (A) is connected with tank (T) via the conical seat in the valve insert. Here the low pressure (P5) applied is blocked by the spherical seat in the valve insert.

When the front attachment clutch solenoid valve (Y88) is actuated **proportionally**, the tappet opens the ball in the valve insert. Here the oil pressure (P5) counteracts the magnetic force via the cone of the valve insert. The proportionally rising magnetic force pushes the tappet further downward and closes the return line (T) with the conical seat. This causes a controlled pressure build-up in the front attachment clutch hydraulic cylinder (352) and therefore smooth starting of the front attachment. When the clutch process is finished, the low pressure (P5) is applied to the front attachment clutch hydraulic cylinder (352) via the consumer port (A) whereas the return line to the tank (T) is blocked.

**Note:** The solenoid valve of the front attachment clutch function (Y88) is different from the other solenoid valves used in the low-pressure hydraulic system.

Threshing mechanism  
clutch  
Grain tank unloading  
Straw chopper clutch  
Sample gate

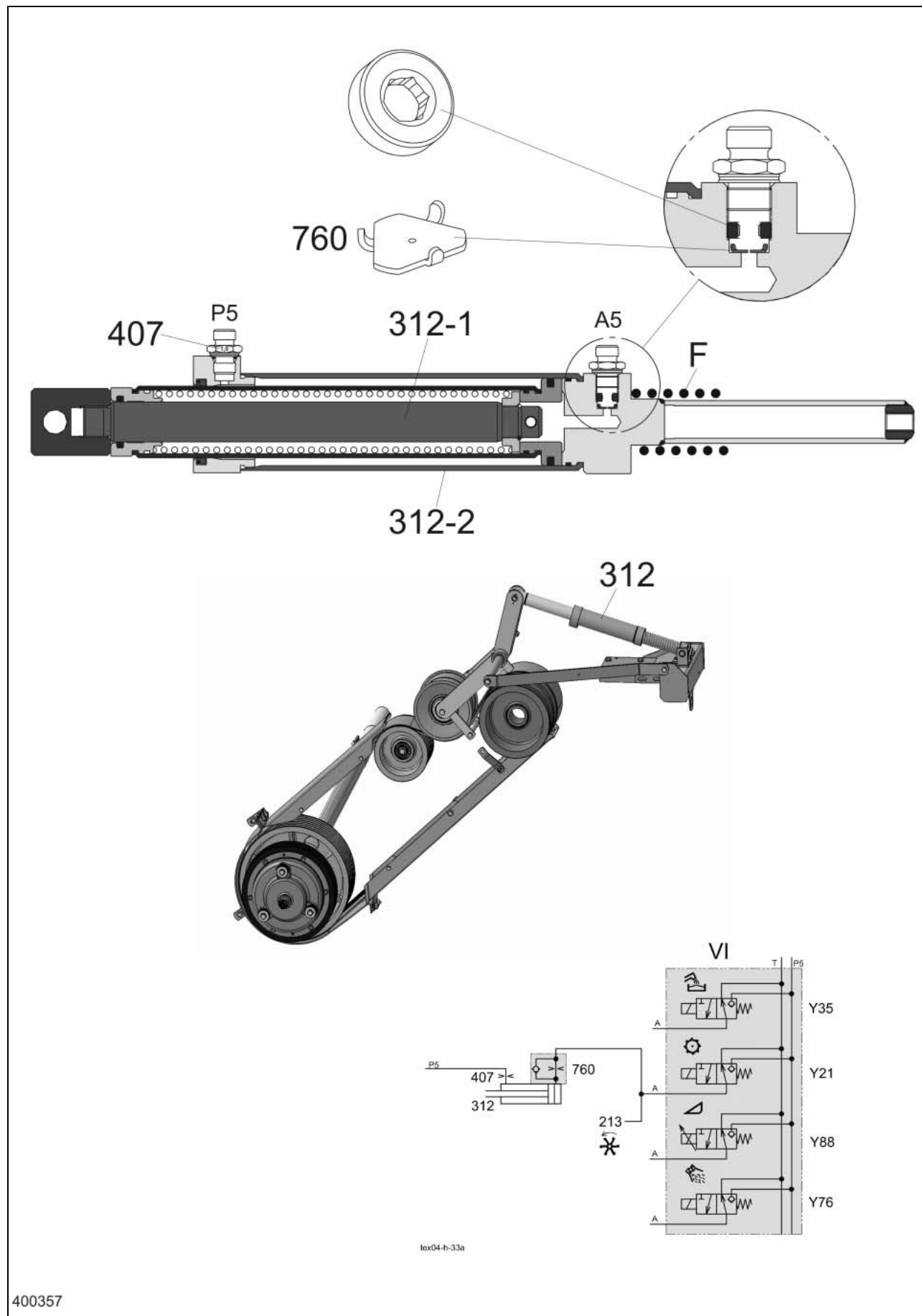
With the solenoid valve (Y21, Y35, Y76) de-energised, a connection is provided from the hydraulic cylinder (A) to the return line into the tank (T) via the conical seat in the valve insert (V). Here the low pressure (P5) applied is blocked by the spherical seat in the valve insert.

When the corresponding solenoid valve (Y21, Y35, Y76) for a given function is actuated, the plunger opens the ball in the valve insert and closes the return line (T) with the conical seat. The low-pressure (P5) is thus applied to the hydraulic cylinder (321, 322, 347 and 760) via the consumer port (A) whereas the return line to the tank (T) is blocked.

**Note:** In case of emergency operation, screw (S) must be slightly screwed in up to the stop (otherwise the valve seat will be damaged) to make the conical seat in the valve insert (V) close the return line to the tank (T) tightly.

**4.1.4 Hydraulic Cylinder of Low-pressure Hydraulic System**

Threshing mechanism clutch engage (step cylinder)



400357

**Key to diagram:**

213	Reel drive pump .....	15 cm <sup>3</sup> /rev.
312-1	Threshing mechanism clutch hydraulic cylinder 1 <sup>st</sup> stage	
312-2	Threshing mechanism clutch hydraulic cylinder 2 <sup>nd</sup> stage	
407	Orifice plate G	
760	One-way restrictor, one-sided	
Y21	Threshing mechanism clutch engage solenoid valve	
Y35	Grain tank unloading solenoid valve	
Y76	Straw chopper coupling solenoid valve	
Y88	Front attachment clutch solenoid valve	
A5	Threshing mechanism clutch engage port (step cylinder)	
F	Spring	
P5	Low-pressure port	
VI	Low-pressure hydraulics valve block	

**Description of function:**

The threshing mechanism clutch hydraulic cylinder (312) allows smooth engaging of the threshing mechanism, matched to the machine.

General low-pressure  
hydraulic system rules:

With the engine running, a pressure of (19+4 bar) always acts on the hydraulic cylinders via port (P5). This ensures that the corresponding drive belt is relieved when functions are "not actuated".

Engaging the threshing  
mechanism clutch

The threshing mechanism clutch engage solenoid valve (Y21) is actuated. The applied low pressure is transmitted into the step cylinder (312) via port (A5).

At first the first step (312-1) of the step cylinder extends and pre-stresses the drive belt = smooth engaging of threshing mechanism, then the second step (312-2) of the step cylinder extends and ensures the positive engagement of the drive belt. Stage 1 retracts.

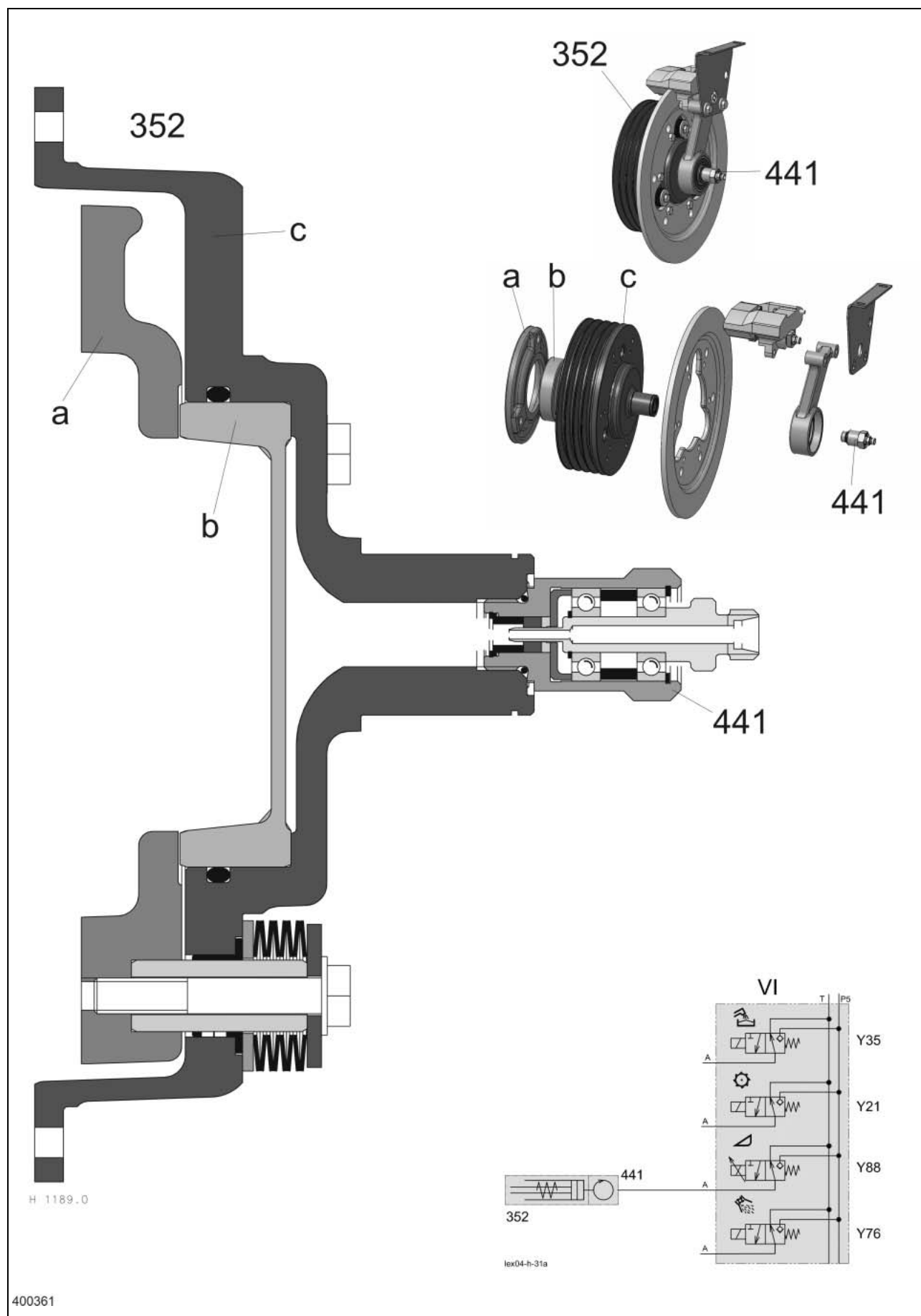
Disengaging the threshing  
mechanism clutch

When disengaging, the 2<sup>nd</sup> step (312-2) of the step cylinder is retracted by the applied low pressure at port (P5).

Note: The hydraulic cylinder (312), the one-way restrictor valve (760) in port A5 and the orifice plate (407) in port P5 are individually matched to the machine and are therefore different, depending on the machine type!

**Hydraulic Cylinder of Low-pressure Hydraulic System**

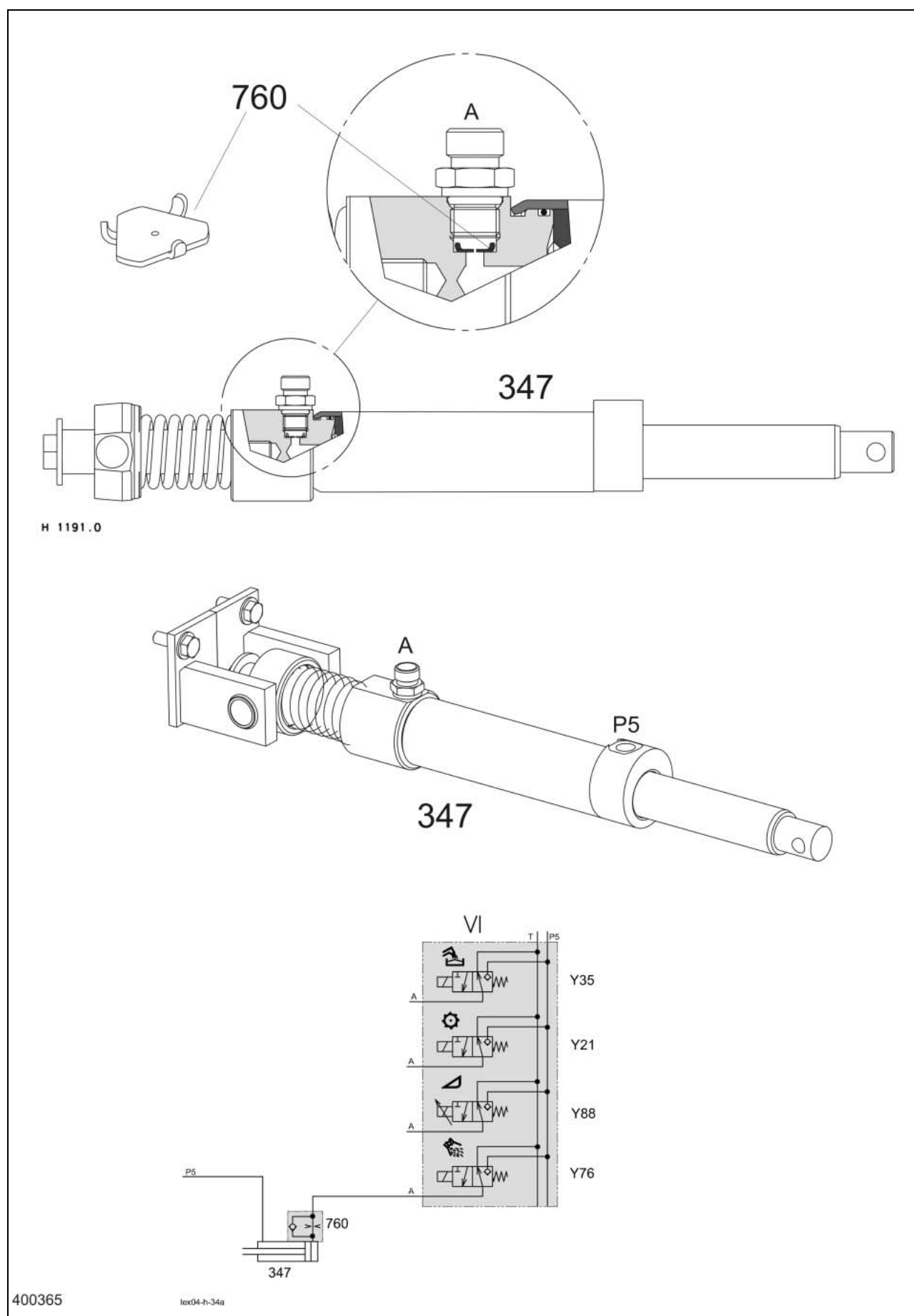
Front attachment clutch with rotary coupling





**Key to diagram:**

352	Front attachment clutch hydraulic cylinder
441	Rotary coupling
Y21	Threshing mechanism clutch engage solenoid valve
Y35	Grain tank unloading solenoid valve
Y76	Straw chopper coupling solenoid valve
Y88	Front attachment clutch solenoid valve

**Hydraulic Cylinder of Low-pressure Hydraulic System**  
Straw chopper clutch

**Key to diagram:**

347	Straw chopper clutch hydraulic cylinder
760	One-way restrictor, one-sided
Y21	Threshing mechanism clutch engage solenoid valve
Y35	Grain tank unloading solenoid valve
Y76	Straw chopper coupling solenoid valve
Y88	Front attachment clutch solenoid valve
A	Consumer port
P5	Low-pressure hydraulics port
VI	Low-pressure hydraulics valve block

**Description of function:**

General low-pressure hydraulic system rules:

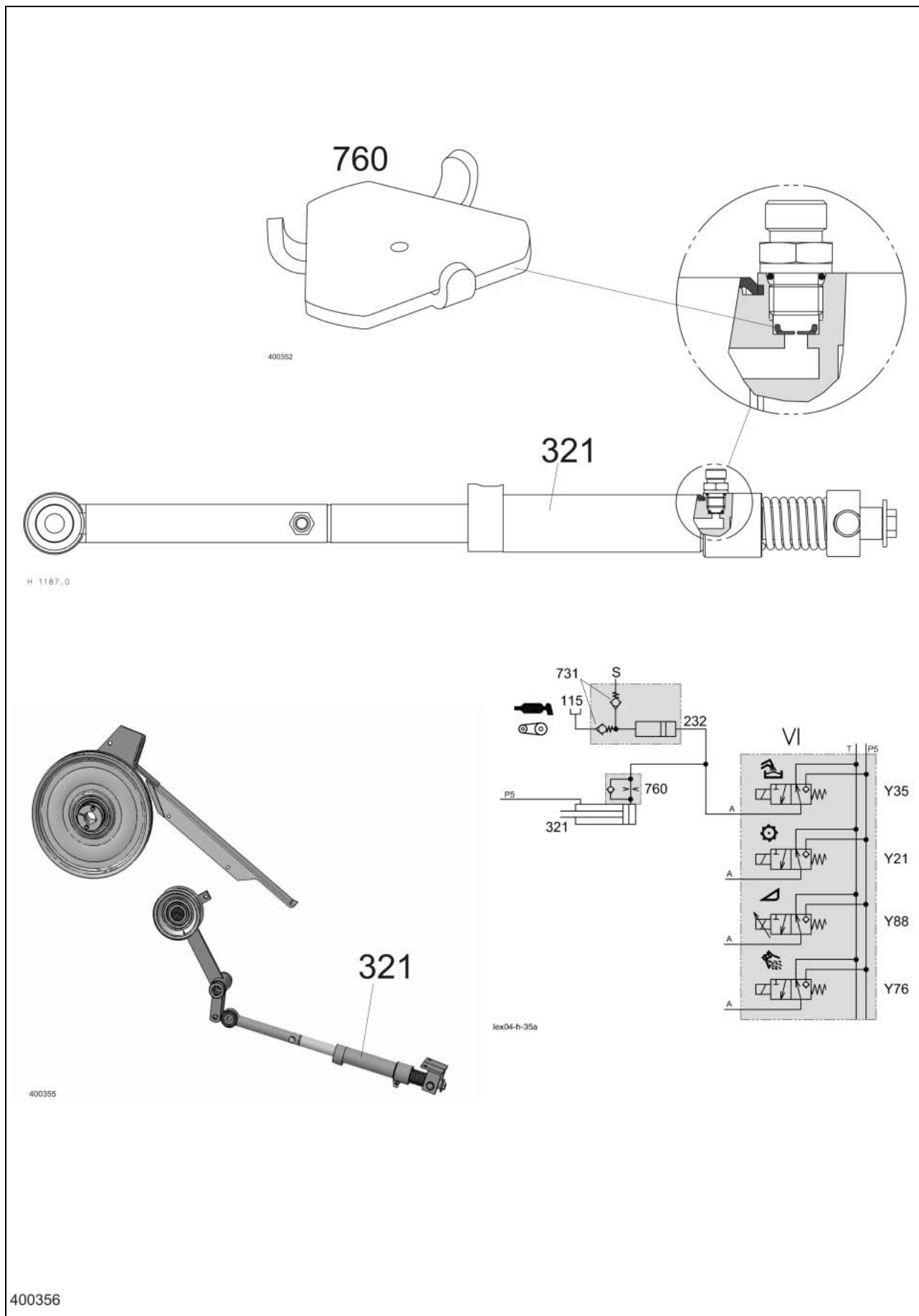
With the engine running, a pressure of (19<sup>+4</sup> bar) always acts on the hydraulic cylinders via port (P5). This ensures that the corresponding drive belt is relieved when functions are "not actuated".

Engaging the straw chopper clutch

The straw chopper clutch solenoid valve (Y76) is actuated. The applied low pressure is transmitted into the piston top space of the straw chopper clutch hydraulic cylinder (347) via port (A). The straw chopper clutch hydraulic cylinder (347) extends against the low pressure acting in the ring space. The restrictor (760) here ensures smooth engaging.

Disengaging the straw chopper clutch

When disengaging, the straw chopper clutch hydraulic cylinder (347) retracts since the low pressure acts in the ring space. The oil displaced from the piston top space during this process flows to the tank (T) via the unactuated straw chopper clutch solenoid valve (Y76).

**Hydraulic Cylinder of Low-pressure Hydraulic System**  
Grain tank unloading

**Key to diagram:**

115	Lubricant reservoir
232	Chain lubrication pump
321	Grain tank unloading hydraulic cylinder
731	Return line valve (non-return valve)
760	One-way restrictor, one-sided
Y21	Threshing mechanism clutch engage solenoid valve
Y35	Grain tank unloading solenoid valve
Y76	Straw chopper coupling solenoid valve
Y88	Front attachment clutch solenoid valve
A	Consumer port
P5	Low-pressure hydraulics port
VI	Low-pressure hydraulics valve block

**Description of function:**

General low-pressure hydraulic system rules:

With the engine running, a pressure of (19<sup>+4</sup> bar) always acts on the hydraulic cylinders via port (P5). This ensures that the corresponding drive belt is relieved when functions are "not actuated".

Engaging the grain tank unloading

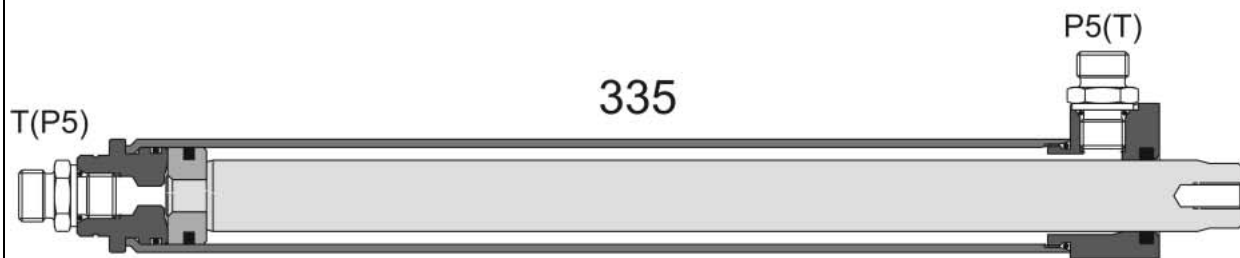
The grain tank unloading solenoid valve (Y35) is actuated. The applied low pressure is transmitted into the piston top space of the grain tank unloading hydraulic cylinder (321) via port (A). The grain tank unloading hydraulic cylinder (321) extends against the low pressure acting in the ring space. The restrictor (760) here ensures smooth engaging.

Disengaging the grain tank unloading

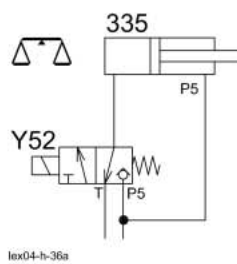
When disengaging, the grain tank unloading hydraulic cylinder (321) retracts since the low pressure acts in the ring space. The oil displaced from the piston top space during this process flows to the tank (T) via the unactuated grain tank unloading solenoid valve (Y35).

**Hydraulic Cylinder of Low-pressure Hydraulic System**

Sample gate (moisture measurement)



H 1200.0



400514

**Key to diagram:**

335	Sample gate hydraulic cylinder (moisture measurement)
Y52	YIELD METER sample gate solenoid valve
P5	Low-pressure hydraulics port
T	Tank port

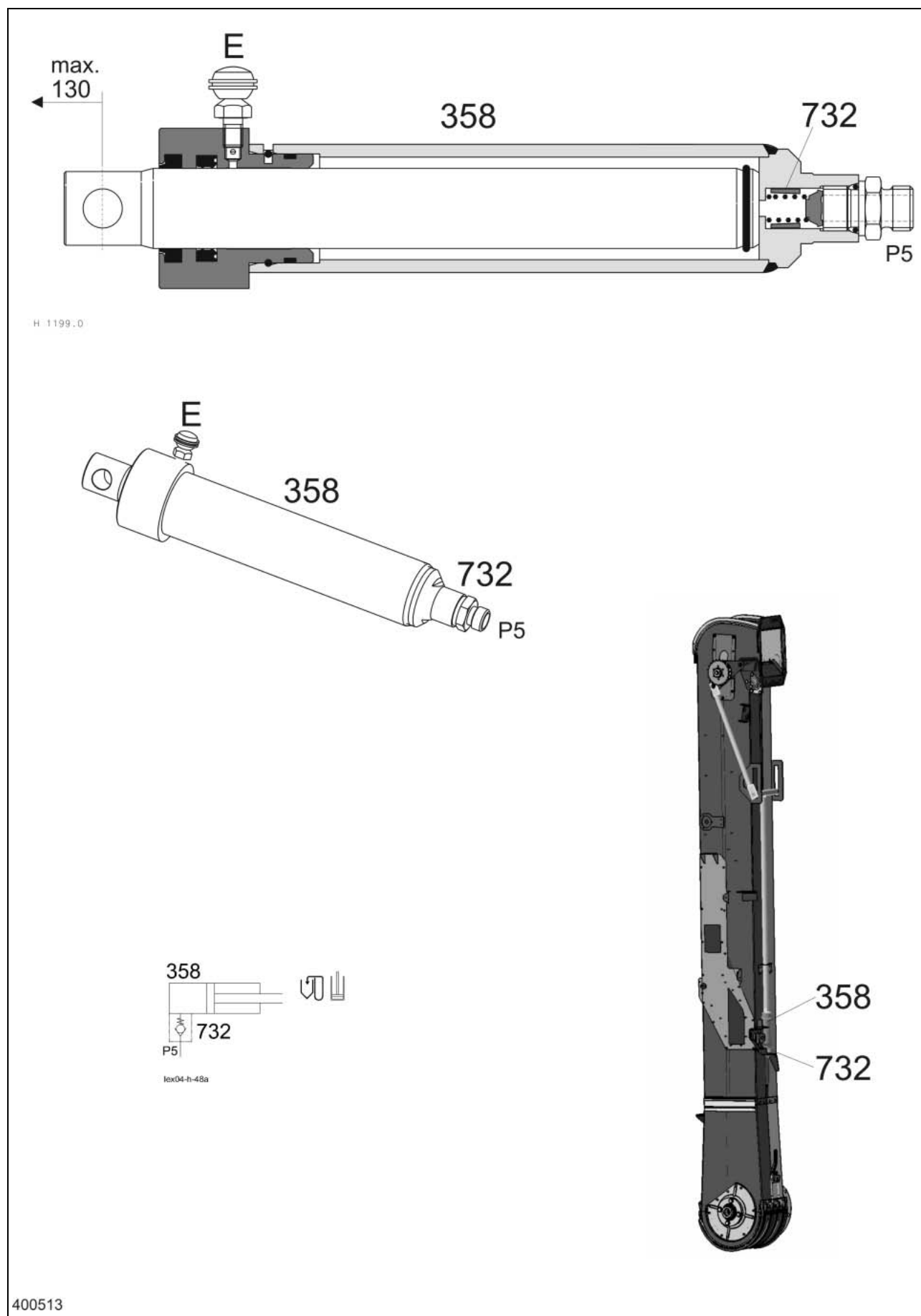
**Description of function:**

## Humidity measurement

The measurements made by the humidity sensor (B61) are displayed by the yield meter module (A21) in the terminal (A30) via the CAN bus, but are not used for calculating the gross weight. Terminal A30 requires these measured values for calculation only for stating the net weight in order processing.

The humidity measurement is performed in the grain elevator using sensors (see Electric System – Circuit Diagram 27). The sample gate here opens/closes the measuring chamber. The measuring intervals are controlled by the yield meter module (A21) as a function of the yield. The time between individual measurements is reduced linearly from approx. 2 min at 3 t/h to approx. 15 s at 50 t/h.

In order to empty and clean the measuring chamber, the sample gate (335) is additionally moved once when turning off the threshing mechanism.

**Hydraulic Cylinder of Low-pressure Hydraulic System**  
Grain elevator chain tension



**Key to diagram:**

358	Grain elevator chain tension hydraulic cylinder
732	Non-return valve
E	Vent plug
P5	Low-pressure port

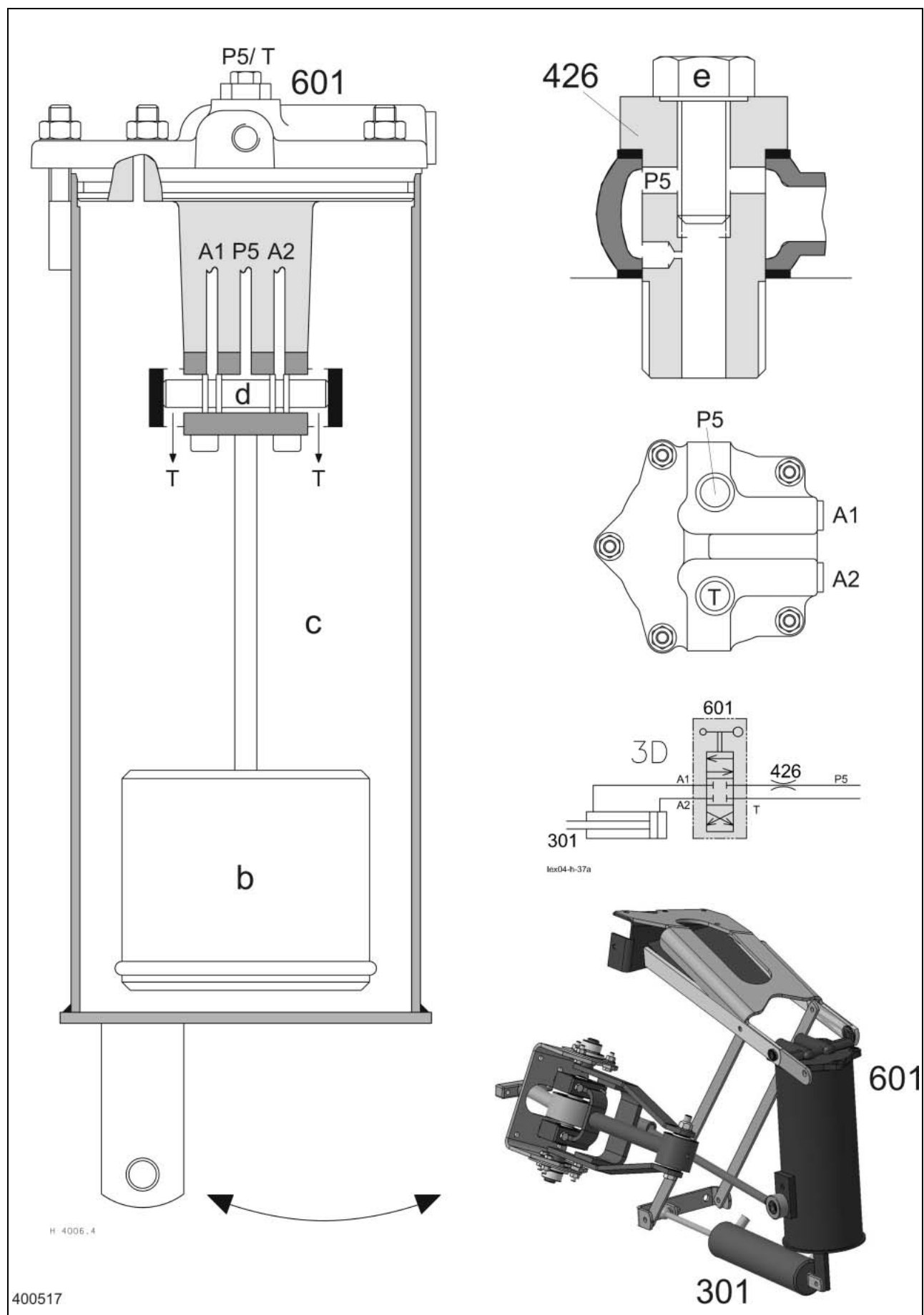
**Description of function:**

In this version, the grain elevator chain is permanently tensioned hydraulically, using low pressure. The non-return valve (732) prevents pressure relief when the machine is standing still.

**Note:** When working on the grain elevator chain, the piston is relieved from pressure by opening the vent plug (E).  
Maximum cylinder stroke is 130 mm.

**4.1.5 3-D Cleaning System**

Pendulum housing with valve and hydraulic cylinder



**Key to diagram:**

301	3-D sieve pan hydraulic cylinder
426	Hollow screw with restrictor bore ..... Ø 0.8 mm
601	3-D sieve pan pendulum control valve
T	Tank port
P5	Ground drive feed pump port
A	3-D sieve pan hydraulic cylinder port
B	3-D sieve pan hydraulic cylinder port
b	Pendulum
c	Housing
d	Spool
e	Vent plug (M6x16)

**Description of function:****3-D cleaning system**

Even with a slight lateral inclination of the machine, the pendulum housing (c) will also change its position relative to the spool (d) which is constantly kept in a horizontal position by the pendulum (b).  
 In this process, volume flow (P5) is released to one of the two sides (A/B) of the hydraulic cylinder (301) while the opposite side (A/B) is connected with the return line to the tank (T) via the pendulum housing (c).  
 The hydraulic cylinder (301) moves the pendulum housing (c) until the parallel vertical position relative to the pendulum (b) brings the spool (d) back to the neutral position as well.  
 The movement of the pendulum housing (c) adjusts the sieve pan mechanically by means of a linkage.

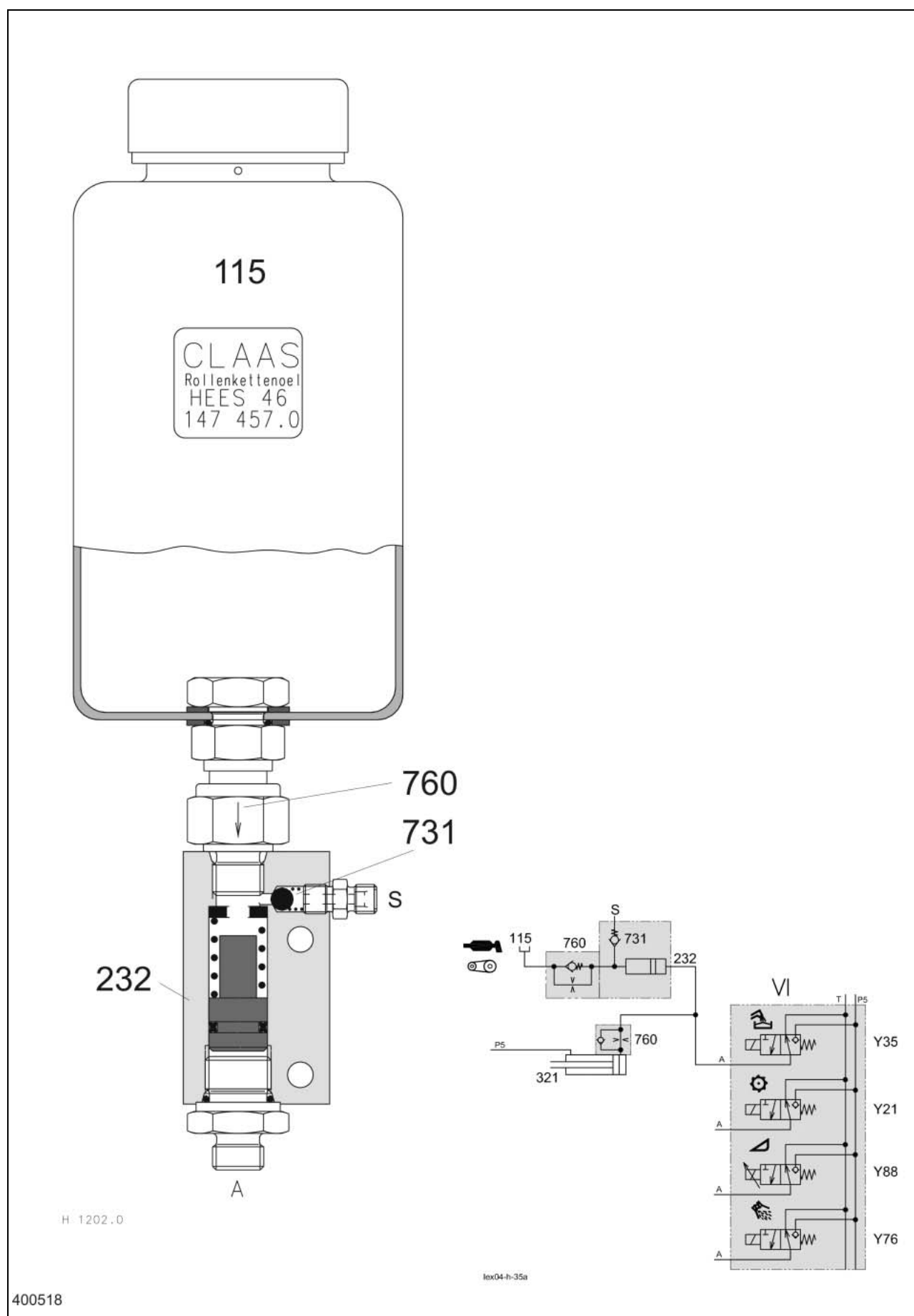
**Bleeding of 3-D system**

- The machine is running at max. diesel engine no-load speed.
- For filling and venting the pendulum housing, first the vent plug (e) is loosened so the oil can flow without restriction.
- With the rodding to the sieve pan unhinged, the pendulum housing (c) is moved manually until the oil comes out without bubbles.

**Note:** When operating the 3-D cleaning system, the large bore in the hollow screw (426) must be plugged. An unrestricted oil flow would result in constant motion of the pendulum housing (c) against the end positions.

**4.1.6 Grain Tank Unloading Chain Lubrication**

Lubricant pump with reservoir



**Key to diagram:**

115	Grain tank unloading lubricant reservoir
231	Grain tank unloading lubricant pump
232	Chain lubrication pump
321	Grain tank unloading clutch hydraulic cylinder
731	Non-return valve
760	One-way restrictor, one-sided
Y21	Threshing mechanism clutch engage solenoid valve
Y35	Grain tank unloading solenoid valve
Y76	Straw chopper coupling solenoid valve
Y88	Front attachment clutch solenoid valve
A	Grain tank unloading solenoid valve port
S	Lubricating brush port
VI	Low-pressure hydraulics valve block

**Description of function:**

When engaging the grain tank unloading (grain tank unloading solenoid valve Y35 is actuated), the piston of lubricating pump (231) performs a stroke. The oil displaced in this process reaches the lubricating brush via port (S).

When the grain tank unloading solenoid valve (Y35) is shut off, the spring moves the pump piston back to the initial position, with the oil being sucked from the lubricant reservoir (115).

The non-return valves (731) separate the suction side from the discharge side.



**5****Electro-hydraulic  
Gearshift (EHS)**

<b>5.1</b>	<b>Electro-hydraulic Gearshift (EHS) Circuit Diagram LEXION 580-510 .....</b>	<b>5-4</b>
	3-speed manual gearbox .....	5-4
<b>5.2</b>	<b>Electro-hydraulic gearshift (EHS) .....</b>	<b>5-10</b>
	2-speed manual gearbox .....	5-10





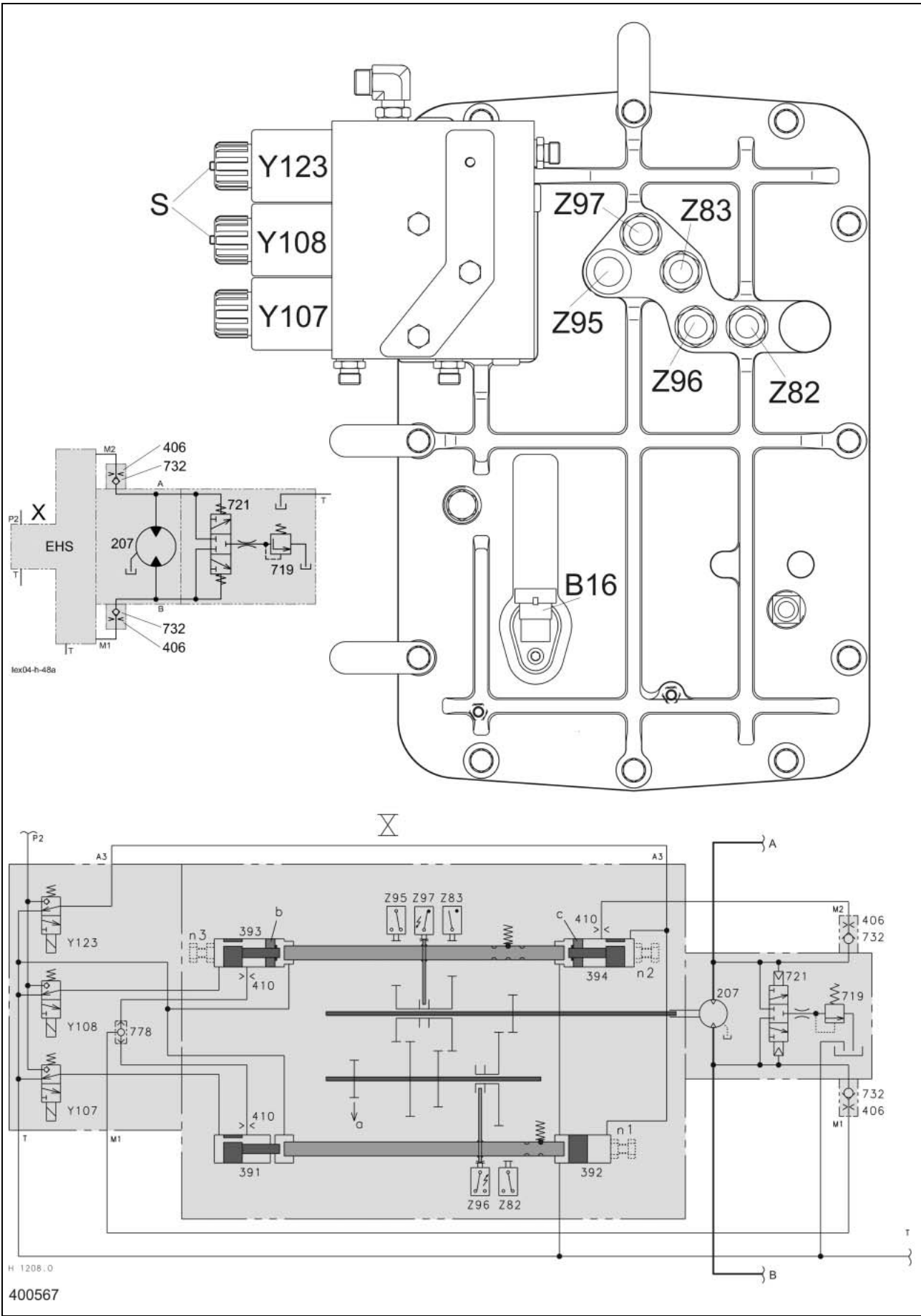
## **5.1**

### **Electro-hydraulic Gearshift (EHS)**

LEXION 580-510

3-speed manual gearbox

5.1 Electro-hydraulic Gearshift (EHS) Circuit Diagram LEXION 580-510  
3-speed manual gearbox



Key to diagram:

- 207 Ground drive fixed displacement motor
- 391 1<sup>st</sup> gear engage hydraulic cylinder
- 392 1<sup>st</sup> gear neutral hydraulic cylinder
- 393 2<sup>nd</sup> gear engage / 3<sup>rd</sup> gear neutral hydraulic cylinder
- 394 3<sup>rd</sup> gear engage / 2<sup>nd</sup> gear neutral hydraulic cylinder
- 406 Orifice plate F ..... 0.8mm
- 410 Orifice plate K ..... 1.5mm
- 719 Ground drive flush pressure control valve
- 721 Ground drive flush-out shuttle valve
- 732 Non-return valve
- 778 EHS shuttle valve
- B16 Gearbox rpm (ground speed) sensor
- Y107 Gearbox shift 1<sup>st</sup> gear solenoid valve
- Y108 Gearbox shift 2<sup>nd</sup> gear solenoid valve
- Y123 Gearbox shift 3<sup>rd</sup> gear solenoid valve
- Z82 Gearbox switch 1<sup>st</sup> gear engaged actual value switch
- Z83 Gearbox switch 2<sup>nd</sup> gear engaged actual value switch
- Z95 Gearbox switch 3<sup>rd</sup> gear engaged actual value switch
- Z96 Gearbox switch 1<sup>st</sup> gear neutral actual value switch
- Z97 Gearbox switch 2<sup>nd</sup>/3<sup>rd</sup> gear neutral actual value switch
- M1 High pressure forward measuring port
- M2 High pressure backward measuring port
- a Drive to differential
- A Ground drive forward hydraulic line
- A3 Gearshift control port
- b Neutral position annular piston
- B Ground drive backward hydraulic line
- c Neutral position annular piston
- n1 Gearbox shifting emergency operation
- n2 Gearbox shifting emergency operation
- n3 Gearbox shifting emergency operation
- P2 Pressurized oil supply from working hydraulics
- S Emergency operation screw
- T Return line
- X EHS assembly, electro-hydraulic gearshift

**Description of function:**

Electro-hydraulic drive  
range changeover

The electro-hydraulic gearshift module A37 (EHS) controls the solenoid coils Y107, Y108 and Y123 for the drive range changeover. This is done in accordance with its programmed switching logic.

The master valve (Y77) is also actuated simultaneously via the diode PCB (DO) in parallel with the solenoid coils by module A37 because these functions require that pressure is built up in the system.

The actual value switches Z82, Z83, Z95, Z97 and Z96 monitor the gearshift operations and transmit the gearshift statuses to the electro-hydraulic gearshift module (EHS) A37.

Shifting the gearbox to  
neutral

The solenoid coils Y108 and Y123 are energized. The shifter rail for the 1<sup>st</sup> gear is set to its neutral position by hydraulic cylinder 392.

The hydraulic cylinders 393 and 394 push against the shifter rail for the 2<sup>nd</sup>/3<sup>rd</sup> gear from both sides. The forces acting on the shifter rail are thus neutralized.

The shifter rail for the 2<sup>nd</sup>/3<sup>rd</sup> gear is now set to its neutral position via the annular pistons b and c.

Engaging a gear

To engage a gear, the corresponding solenoid coil Y107, Y108 or Y123 is actuated by the electro-hydraulic gearshift module (EHS) A37.

When pressurized oil flows into one of the hydraulic cylinders 391, 393 or 394, a small oil quantity also flows through the bore in the piston during the gearshift process.

This oil quantity acts on the hydrostatic ground drive via the ports M1 or M2 and slowly rotates the hydraulic motor 207 to enable better meshing of the gearwheels.

When the gearwheels have meshed, the piston in the hydraulic cylinders (394) and (393) blocks the oil passage to port M1 or M2 and the hydraulic motor 207 is not rotated any more. The piston of the hydraulic cylinder now extends up to its stop.

When the gear engaged has been identified by the actual value switches Z 82, Z83 or Z95, the solenoid coil in question is not energized any more by the electro-hydraulic gearshift module A37 (EHS).

At the same time, the electro-hydraulic gearshift module A37 (EHS) stops actuating the master valve (Y77).

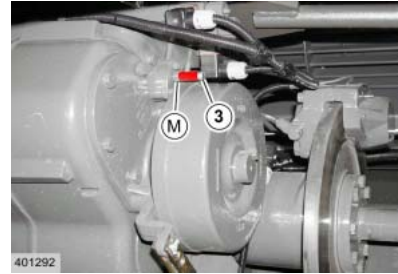
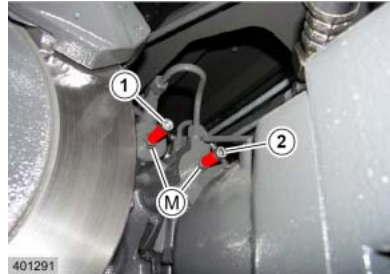
**Description of function:**

Emergency operation

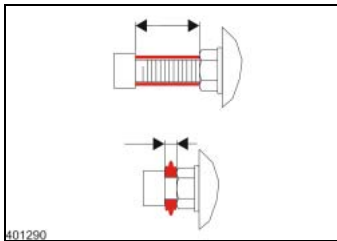
**Observe the safety instructions contained in the Operator's Manual during any emergency operation!**

I. Mechanical emergency operation

If the electro-hydraulic gearshift EHS fails, a mechanical emergency operation of the gearshift is possible using the screws n1, n2 or n3.



Engage neutral position



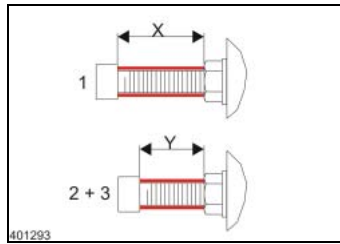
Loosen the sealing nuts (D) at the screws (1-3).

Fully turn in the socket head bolt (1), the sealing nut (D) now makes full contact with the bolt head (the red plastic sleeve is squeezed away). Tighten the sealing nut.

Fully turn in the socket head bolt (2), the sealing nut (D) now makes full contact with the bolt head (the red plastic sleeve is squeezed away). Tighten the sealing nut.

Fully turn in the socket head bolt (3), the sealing nut (D) now makes full contact with the bolt head (the red plastic sleeve is squeezed away). Tighten the sealing nut.

## Restoring the initial status



Loosen the sealing nuts at the screws (1-3).

Adjust cheese-head screw (1, M 8x50) so that the dimension (X) between the sealing nut (D) and the bolt head is  $33^{+1}$  mm with the sealing nut (D) jammed.

Adjust cheese-head screw (2, M 8x45) so that the dimension (Y) between the sealing nut (D) and the bolt head is  $27^{+1}$  mm with the sealing nut (D) jammed.

Adjust cheese-head screw (3, M 8x47.5) so that the dimension (Y) between the sealing nut (D) and the bolt head is  $27^{+1}$  mm with the sealing nut (D) jammed.

The corresponding plastic sleeves are available as spare parts.

## II. Hydraulic emergency operation

Observe the safety instructions contained in the Operator's Manual during any emergency operation!

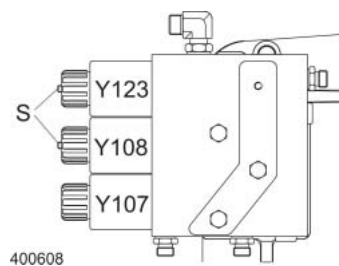
### a) Engage neutral position

Turn in both set screws (S) at the solenoid valves (Y108 and Y123) on the manual gearbox up to the stop. Swing the unloading tube out or in. This actuates the master valve Y77 (pressure is built up) and the gearbox is shifted to neutral.

### b) Engaging the 2<sup>nd</sup> gear

Shift gearbox to neutral position (as described above).  
Screw out the set screw (S) of solenoid valve (Y123) up to the stop.  
Screw in the set screw (S) of solenoid valve (Y108) up to the stop.  
Swing the unloading tube out or in, this actuates the master valve (Y77) and the 2<sup>nd</sup> gear is engaged.  
Now check if the machine is driving by slowly moving the ground speed control lever, otherwise repeat the above process.

After having removed the fault, turn back both set screws (S) firmly up to the stop. Now secure the set screws with varnish. It must be guaranteed that the set screws cannot turn without external intervention.



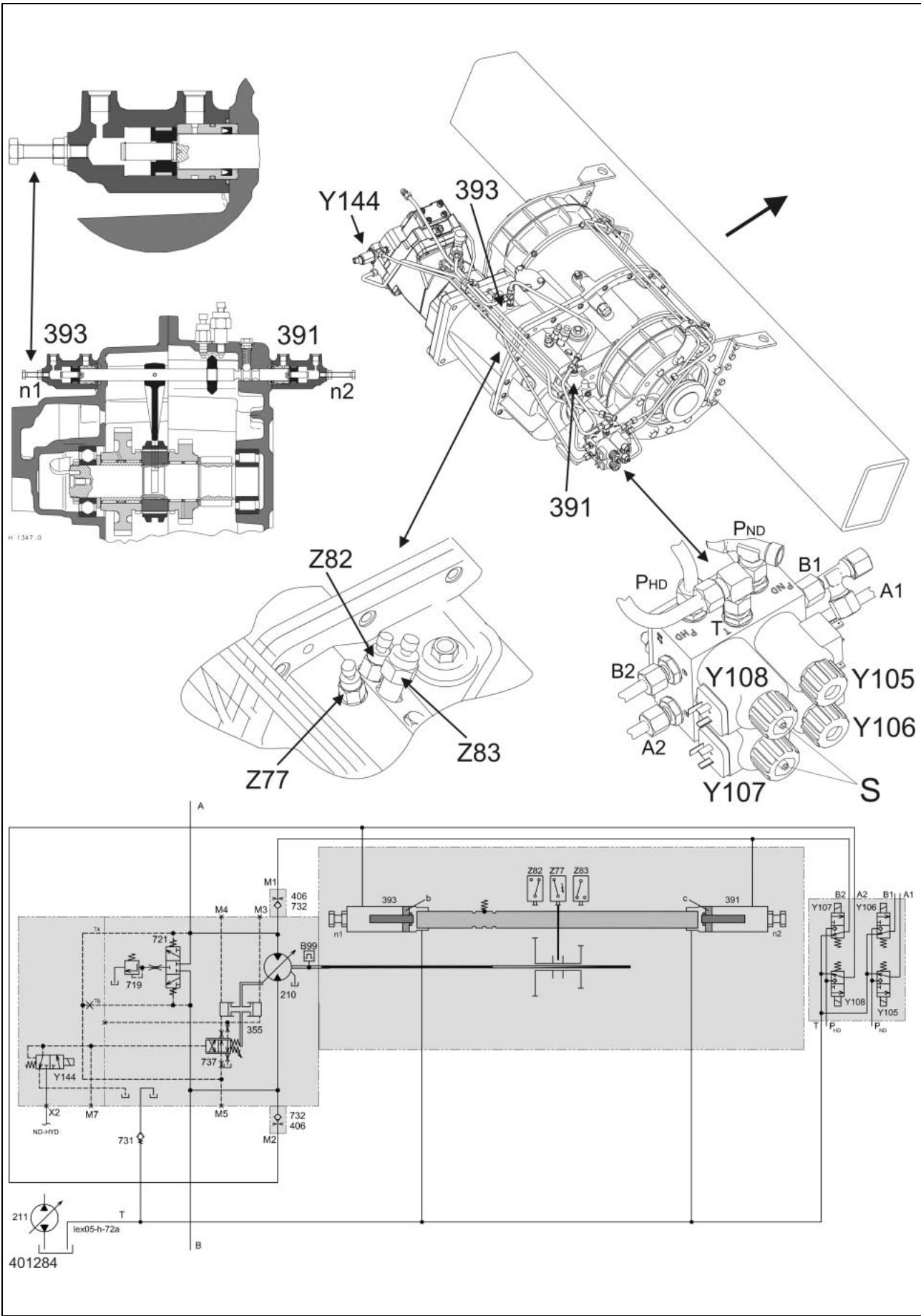


## **5.2**

### **Electro-hydraulic Gearshift (EHS)**

2-speed manual gearbox

5.2 Electro-hydraulic gearshift (EHS)  
2-speed manual gearbox



Key to diagram:

- |      |   |
|------|---|
| 210  | Ground drive variable-displacement motor                        |
| 211  | Ground drive variable-displacement pump                         |
| 355  | Ground drive motor servo control hydraulic cylinder             |
| 391  | 1 <sup>st</sup> gear engage hydraulic cylinder                  |
| 393  | 2 <sup>nd</sup> gear engage hydraulic cylinder                  |
| 406  | Orifice plate F .....0.8mm                                      |
| 719  | Ground drive flush pressure control valve                       |
| 721  | Ground drive flush-out shuttle valve                            |
| 732  | Non-return valve  |
| B99  | Hydraulic motor speed sensor                                    |
| Y105 | Differential lock solenoid valve                                |
| Y106 | Parking brake solenoid valve                                    |
| Y107 | Gearbox shift 1 <sup>st</sup> gear solenoid valve               |
| Y108 | Gearbox shift 2 <sup>nd</sup> gear solenoid valve               |
| Z77  | Gearbox in neutral actual value switch                          |
| Z82  | Gearbox switch 1 <sup>st</sup> gear engaged actual value switch |
| Z83  | Gearbox switch 2 <sup>nd</sup> gear engaged actual value switch |
| M1   | High pressure forward measuring port                            |
| M2   | High pressure backward measuring port                           |
| A    | Ground drive forward hydraulic line                             |
| B    | Ground drive backward hydraulic line                            |
| b    | Neutral position annular ram                                    |
| c    | Neutral position annular ram                                    |
| n1   | Gearbox shifting emergency operation                            |
| n2   | Gearbox shifting emergency operation                            |
| P    | Pressurized oil supply from working hydraulics                  |
| T    | Return line   |



**Description of function:**

Electro-hydraulic drive  
range changeover

The electro-hydraulic gearshift module A37 (EHS) controls the gearbox shifting solenoid coils (Y107) and (Y108) for the gear shifting. This is done in accordance with a programmed switching logic.

The master valve (Y77) is also actuated simultaneously by the electro-hydraulic gearshift module A37 via the diode PCB (DO) in parallel with the solenoid coils because these functions require that pressure is built up in the system.

The actual value switches Z82, Z83 and Z96 monitor the gearshift operations and transmit the gearshift statuses to the electro-hydraulic gearshift module (EHS) A37.

Shifting the gearbox to  
neutral

The gearbox shifting solenoid coils Y107 and Y108 are energized.

The hydraulic cylinders 391 and 393 push against the shifter rail for the 1<sup>st</sup>/2<sup>nd</sup> gear from both sides. The forces acting on the shifter rail are thus neutralized.

The shifter rail for the 1<sup>st</sup>/2<sup>nd</sup> gear is set to its neutral position via the annular rams b and c. When the neutral position is identified by the gearbox in neutral actual value switch (Z77), module A37 deenergizes the gearbox shifting solenoid coils Y107 and Y108.

Engaging a gear

To engage a gear, the corresponding gearbox shifting solenoid coil Y107 or Y108 is actuated by the electro-hydraulic gearshift module (EHS) A37. When pressurized oil flows into one of the hydraulic cylinders (391) or (393), a small oil quantity flows through the orifice plate (406) during the gearshift process.

This oil quantity acts on the hydrostatic ground drive via the ports M1 or M2 and slowly rotates the hydraulic motor 210. This ensures smoother engaging of the gearwheels.

When the gear engaged has been identified by the actual value switches (Z 82), (Z83) or (Z77), the solenoid coil in question is not energized any more by the electro-hydraulic gearshift module A37 (EHS).

At the same time, the electro-hydraulic gearshift module A37 (EHS) stops actuating the master valve (Y77).

**Description of function:**

Emergency operation	<b>Observe the safety instructions contained in the Operator's Manual during any emergency operation!</b>
I. Mechanical emergency operation	If the electro-hydraulic gearshift EHS fails, a mechanical emergency operation of the gearshift is possible using the screws n1 or n2. (The gearbox can be set to neutral.)
II. Hydraulic emergency operation	<b>Observe the safety instructions contained in the Operator's Manual during any emergency operation!</b>
a) Engaging neutral position	Turn in both set screws (S) at the solenoid valves (Y107 and Y108) on the manual gearbox up to the stop. Swing the unloading tube out or in. This actuates the master valve Y77 (pressure is built up) and the gearbox is shifted to neutral.
b) Engaging the 2 <sup>nd</sup> gear	<p>Shift gearbox to neutral (as described above). Screw out the set screw (S) of solenoid valve (Y107) up to the stop. Screw in the set screw (S) of solenoid valve (Y108) up to the stop. Swing the unloading tube out or in, this actuates the master valve (Y77) and the 2<sup>nd</sup> gear is engaged. Now check if the machine is driving by slowly moving the ground speed control lever, otherwise repeat the above process.</p> <p>After having removed the fault, turn back both set screws (S) firmly up to the stop. Now secure the set screws with varnish. It must be guaranteed that the set screws cannot turn without external intervention.</p>

**6****Straw and  
Chaff Spreading**

<b>6.1</b>	<b>Straw and Chaff Spreader.....</b>	<b>6-3</b>
<b>6.2</b>	<b>Uni-spreader.....</b>	<b>6-11</b>
<b>6.3</b>	<b>Radial spreader.....</b>	<b>6-23</b>



## 6.1

### Straw and Chaff Spreader

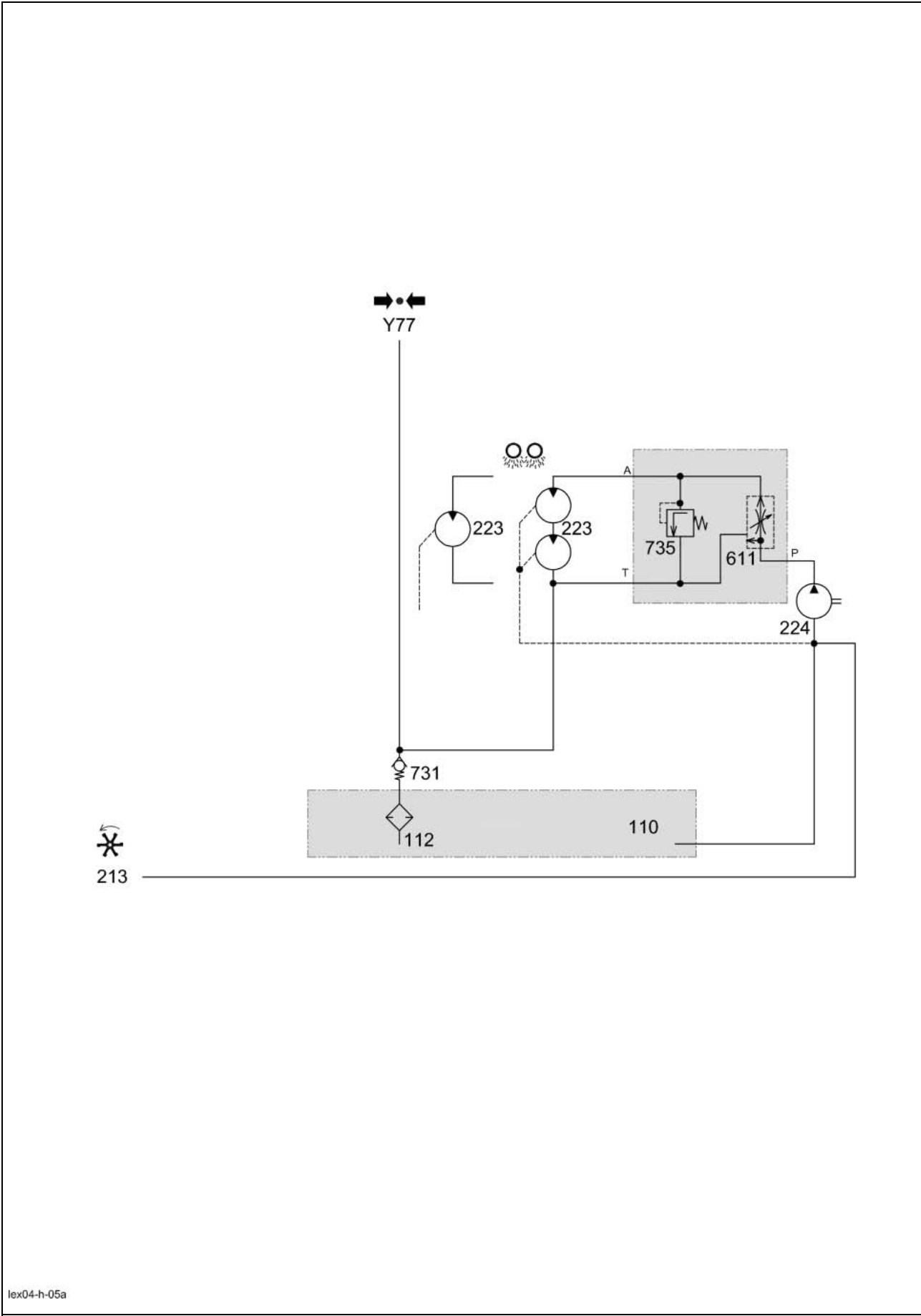
6.1.1	Straw and Chaff Spreader Circuit Diagram.....	6-6
6.1.2	Straw and Chaff Spreader Drive.....	6-8
	Flow control valve with pressure relief valve .....	6-8



### **6.1.1**

**Circuit Diagram  
Straw and Chaff Spreader**

6.1.1 Straw and Chaff Spreader Circuit Diagram



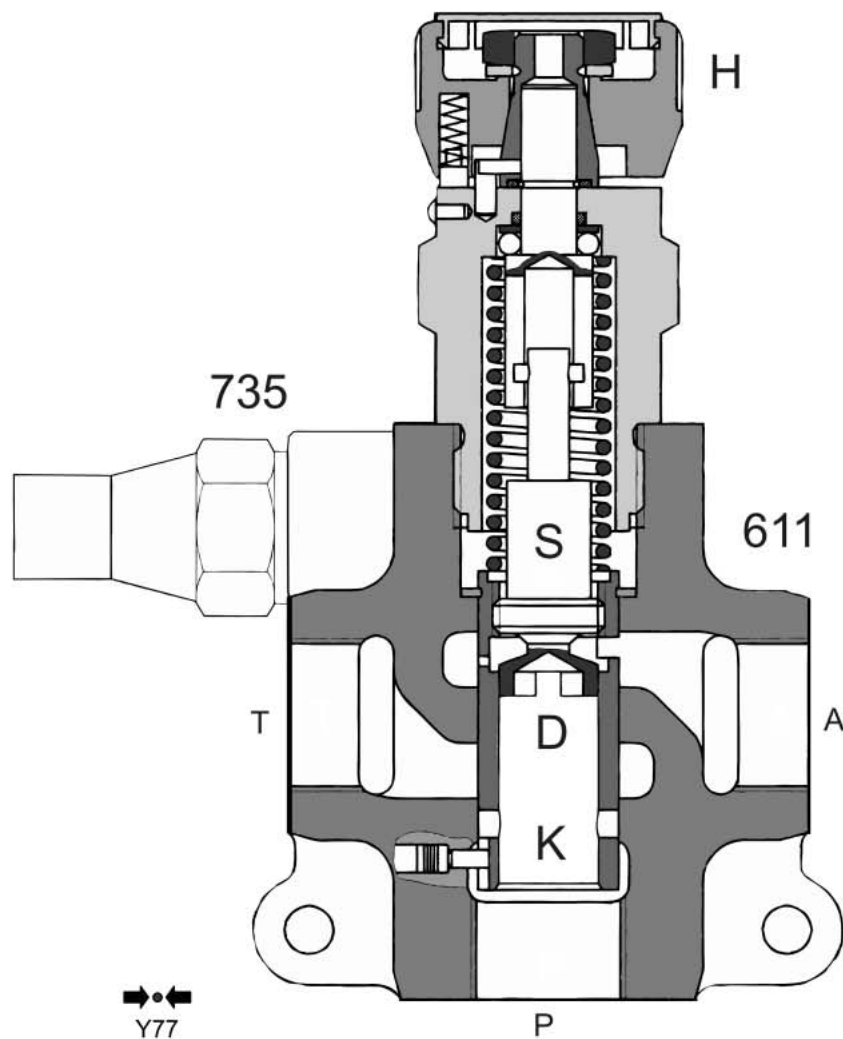
Key to diagram:	
110	Oil tank
112	Return filter
223	Chaff spreader / Straw spreader hydraulic motor ..... 19 cm <sup>3</sup> /rev.
224	Chaff spreader / Straw spreader hydraulic pump ..... 8 cm <sup>3</sup> /rev.
611	Chaff spreader / Straw spreader flow control valve ..... 0 -19 l/min
731	Return line valve (non-return valve)
735	Chaff spreader pressure relief valve ..... 150 bar
Y77	Working hydraulics master valve solenoid valve
P	Pump port
T	Tank port



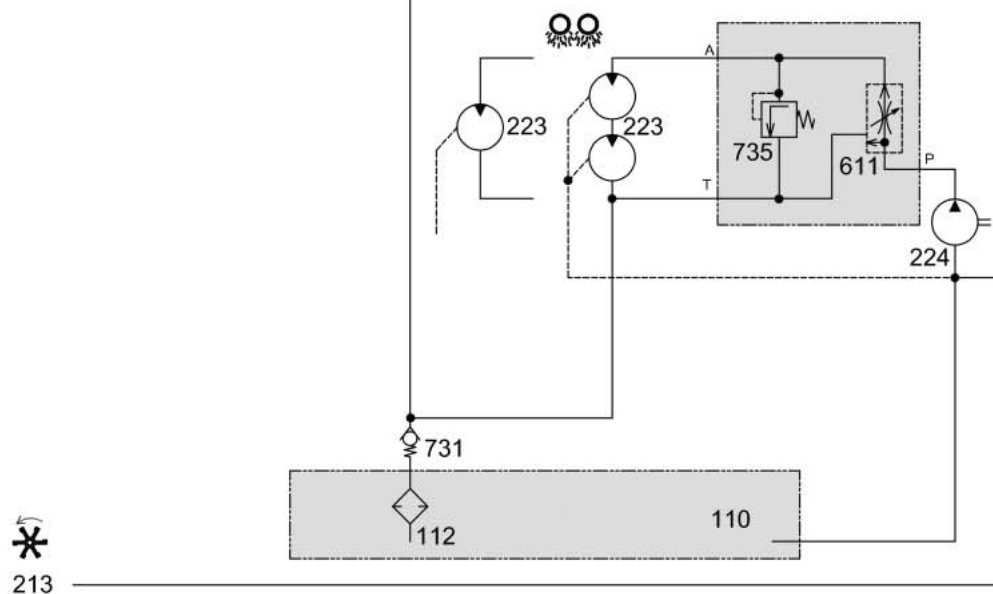
**Notes:**

**6.1.2 Straw and Chaff Spreader Drive**

Flow control valve with pressure relief valve



Y77



400367

lex04-h-05a

**Key to diagram:**

110	Oil tank
112	Return filter
223	Chaff spreader / Straw spreader hydraulic motor ..... 19 cm <sup>3</sup> /rev.
224	Chaff spreader / Straw spreader hydraulic pump ..... 8 cm <sup>3</sup> /rev.
611	Chaff spreader / Straw spreader flow control valve .... 0 -19 l/min
731	Return line valve (non-return valve)
735	Chaff spreader pressure relief valve ..... 150 bar
A	Chaff spreader / Straw spreader hydraulic motor port
P	Pump port
T	Tank port
H	Handwheel
K	Control piston
O	Bore
Q	Transverse bores
S	Spindle
ST	Control edge

**Description of function:****Flow control valve (611)**

The flow control valve (611) splits up the total volume flow (port P) into:

- a constant volume flow driving the chaff spreader / straw spreader hydraulic motor (223) at constant speed via port (A). The constant volume flow is 8-19 l/min., according to the setting of handwheel (H).
- a residual volume flow flowing into the tank via port (T).

The handwheel (H) adjusts the spindle (S) axially. During this, a fixed opening cross-section is adjusted at the control edge.

The total volume flow enters at port (P). A constant volume flow now flows through the opening cross-section at the control edge (ST) via port (A) to the chaff spreader / straw spreader hydraulic motor (223).

Since the opening cross-section at the control edge (ST) puts up resistance to the flow, a ram pressure is created ahead of the piston (K). This pressure moves the piston (K) against the control spring until the transverse bores (Q) to port (T) are opened. Now the residual volume flows to the tank via these bores.

Turning in the handwheel (H)

= small opening cross-section at the control edge (ST)

= slow speed of hydraulic motor of chaff spreader / straw spreader (223).

Turning out the handwheel (H)

= large opening section-section at the control edge (ST)

= high speed of hydraulic motor of chaff spreader / straw spreader (223).

**Pressure relief valve (735)**

The load pressure of the chaff spreader / straw spreader hydraulic motor (223) acts on the pressure relief valve (735) via bore (O).

When the load pressure rises above 150 bar, the pressure relief valve (735) opens the connection to the tank (port T) and thus determines the maximum pressure in the chaff spreader / straw spreader circuit.



## 6.2

### Uni-spreader

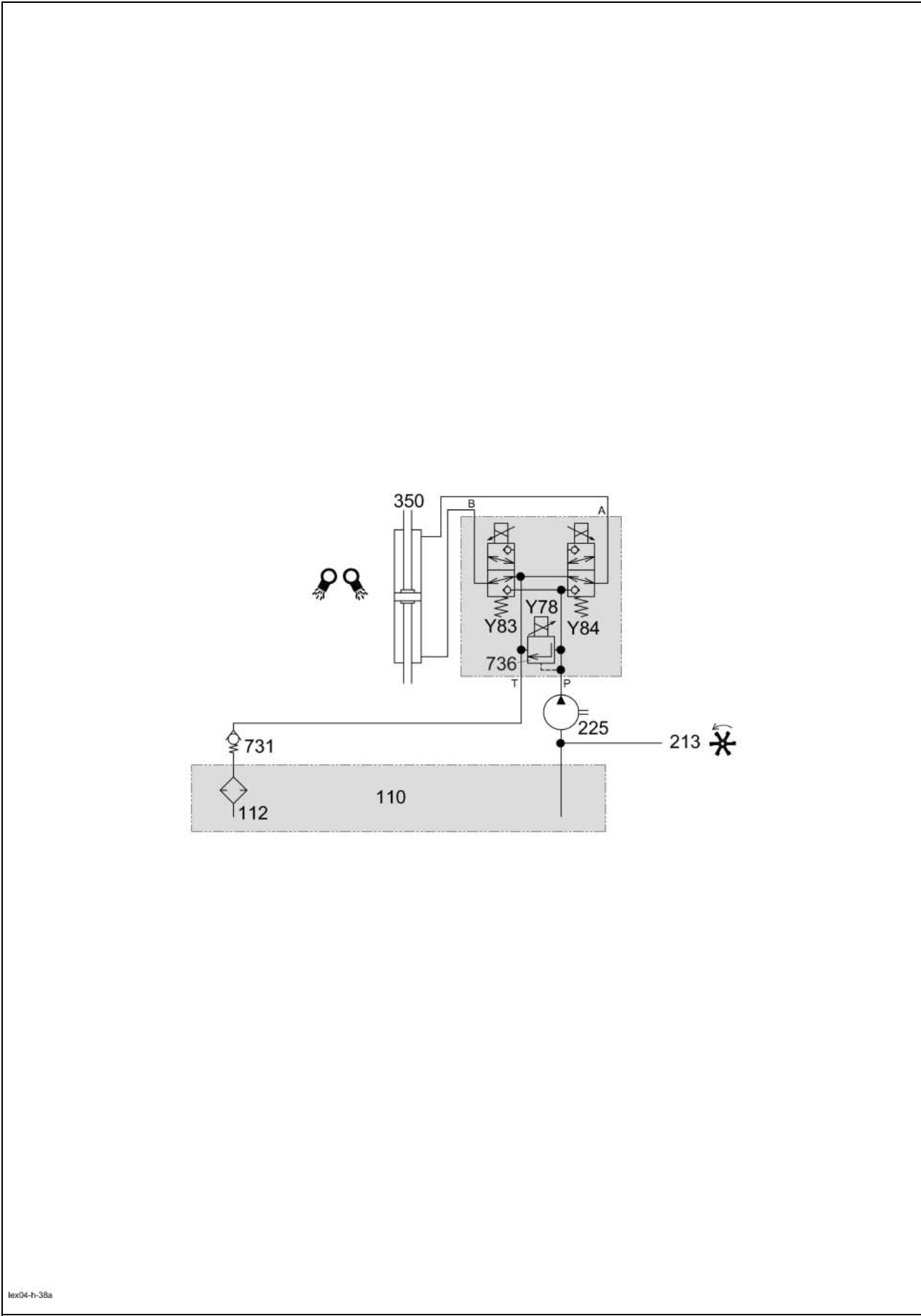
<b>6.2.1</b>	<b>Uni-spreader (VGS) Circuit Diagram .....</b>	<b>6-14</b>
<b>6.2.2</b>	<b>Uni-spreader (VGS) Drive .....</b>	<b>6-16</b>
	4/3 way solenoid valve with master valve .....	6-16
	Hydraulic cylinder .....	6-20



### **6.2.1**

#### **Uni-spreader (VGS) Circuit Diagram**

6.2.1 Uni-spreader (VGS) Circuit Diagram



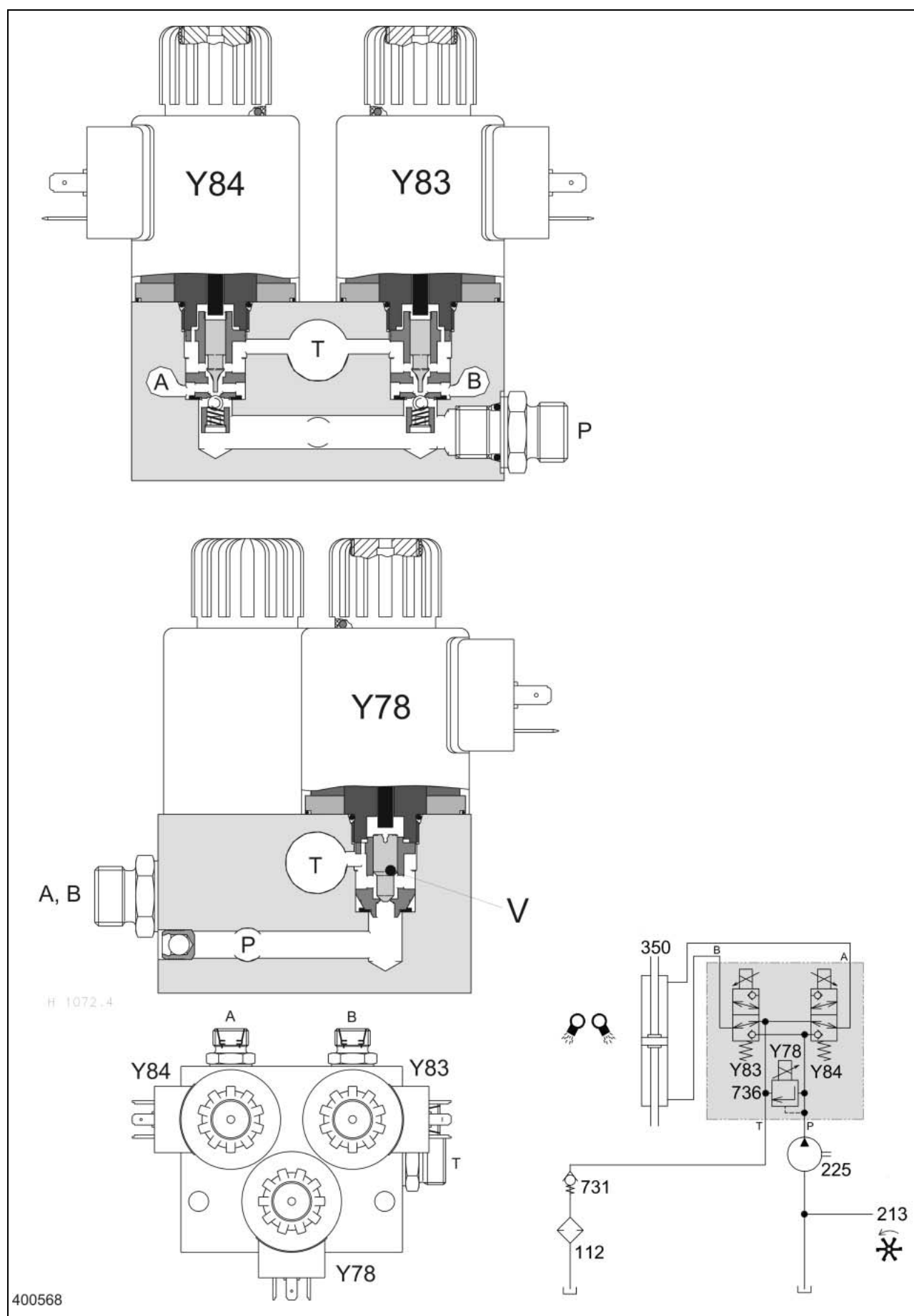
Key to diagram:	
110	Oil tank
112	Return filter
213	Reel drive pump
225	Uni-spreader hydraulic pump..... 5.5 cm <sup>3</sup>
350	Uni-spreader hydraulic cylinder
731	Return line valve (non-return valve)
736	Uni-spreader pressure relief valve
Y83	Swing uni-spreader to the left solenoid valve
Y84	Swing uni-spreader to the right solenoid valve
Y78	Master valve with pressure relief valve..... 60 bar
A	Swing uni-spreader to the right hydraulic cylinder port
B	Swing uni-spreader to the left hydraulic cylinder port
P	Pump port
T	Tank port



**Notes:**

**6.2.2 Uni-spreader (VGS) Drive**

4/3 way solenoid valve with master valve



**Key to diagram:**

110	Oil tank
112	Return filter
213	Uni-spreader drive pump
225	Uni-spreader drive pump
350	Uni-spreader hydraulic cylinder
731	Return line valve (non-return valve)
736	Uni-spreader pressure relief valve
Y78	Master valve with pressure relief valve ..... 60 bar
Y83	Swing uni-spreader to the left solenoid valve
Y84	Swing uni-spreader solenoid valve
A	Swing uni-spreader to the right hydraulic cylinder port
B	Swing uni-spreader to the left hydraulic cylinder port
P	Pump port
T	Tank port
V	Master valve valve insert

**Description of function:****neutral**

When the threshing mechanism is engaged, the independent hydraulic pump of the uni-spreader (225) is also driven.  
The pumped volume flow opens the valve insert (V) in the master valve (Y78) and flows into the tank via port (T).

Both sides of the hydraulic cylinder (350) are connected to the tank (T) via the valve inserts of the unactuated solenoid valves (Y83/Y84) so that the uni-spreader can be moved by hand and locked in the centre position.

**Swinging**

Depending on the necessary direction of movement, one of the solenoid valves (Y83/Y84) and, at the same time, the master valve (Y78) is actuated. The corresponding pilot spool opens the ball in the valve insert and closes the return line to the tank.

The volume flow flows into the hydraulic cylinder (350) via the opened ball and port (A or B) – the hydraulic cylinder extends. The oil displaced out of the other cylinder side during this process flows to the tank (T) via the unactuated solenoid valve (Y83/Y84).

**End damping of hydraulic cylinder**

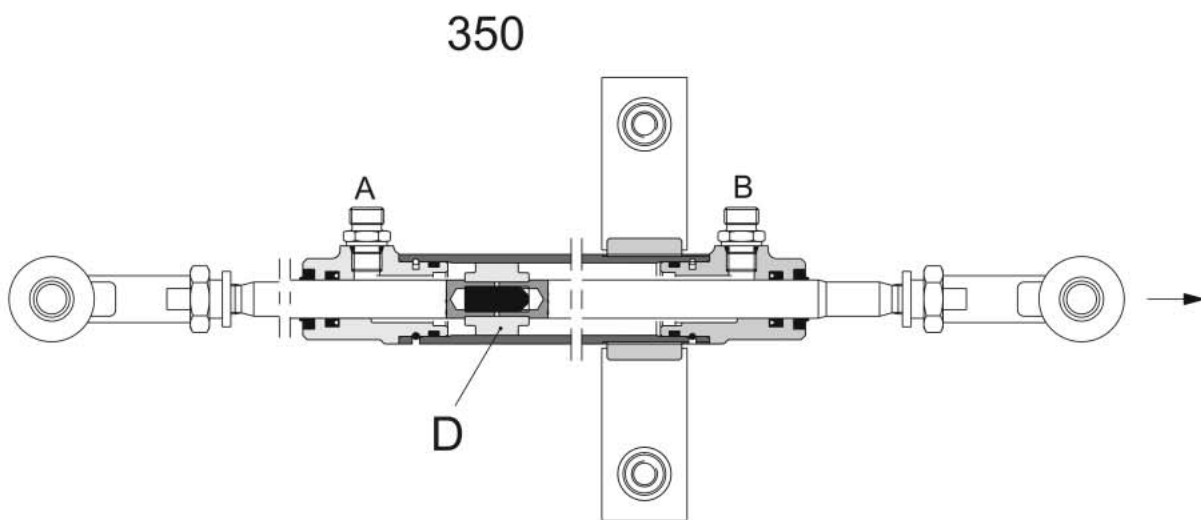
Before the hydraulic cylinder (350) reaches its end position, the electric voltage of the master valve (Y78) is lowered in a modulated way. During this process, the master valve (Y78) opens, so that a partial volume flow is diverted into the tank (T). This reduces the volume flow flowing to the hydraulic cylinder (350) and the speed of hydraulic cylinder (350) is reduced.

**Pressure relief valve**

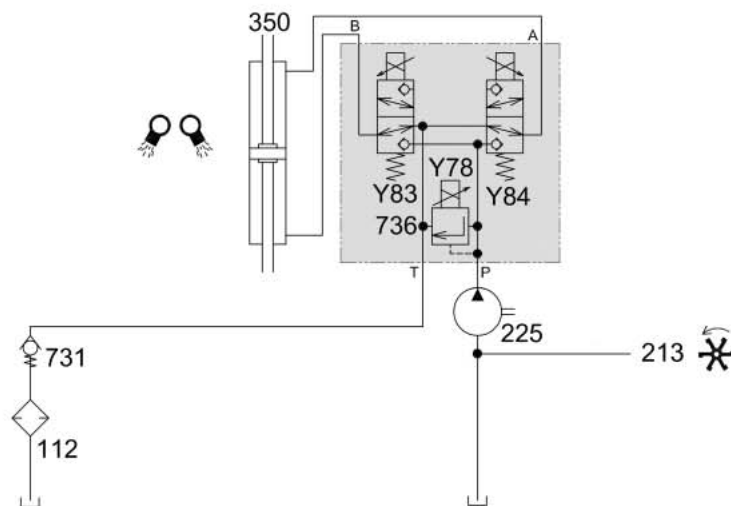
If the load pressure in the consumer ports (A/B) rises above 60 bar, the valve insert (V) is opened against the applied force of the solenoid coil. Thus the master valve (Y78) acts as a pressure relief valve.

**Note:** After engaging the threshing mechanism, the electronic module first automatically moves the uni-spreader over the full travel to the right and the left in order to learn the limit stops. After this, the module actuates the solenoid valves (Y83/Y84) alternately as a function of the selected swing angle and the swing path.



**Uni-spreader (VGS) Drive**  
Hydraulic cylinder

H 1020.4



lex04-h-38a

400539

**Key to diagram:**

112	Return filter
213	Uni-spreader fan drive pump
225	Uni-spreader fan drive pump
350	Uni-spreader hydraulic cylinder
731	Return line valve (non-return valve)
736	Uni-spreader pressure relief valve
Y78	Master valve with pressure relief valve ..... 60 bar
Y83	Swing uni-spreader to the left solenoid valve
Y84	Swing uni-spreader solenoid valve
A	Swing uni-spreader to the right solenoid valve port
B	Swing uni-spreader to the left solenoid valve port
D	Piston with end damping
G	Set screw

**Note:** The connecting rods are connected to the piston by a set screw (G). This piston is provided with steps for end damping (D) and is used without seal.





## 6.3

### Radial spreader

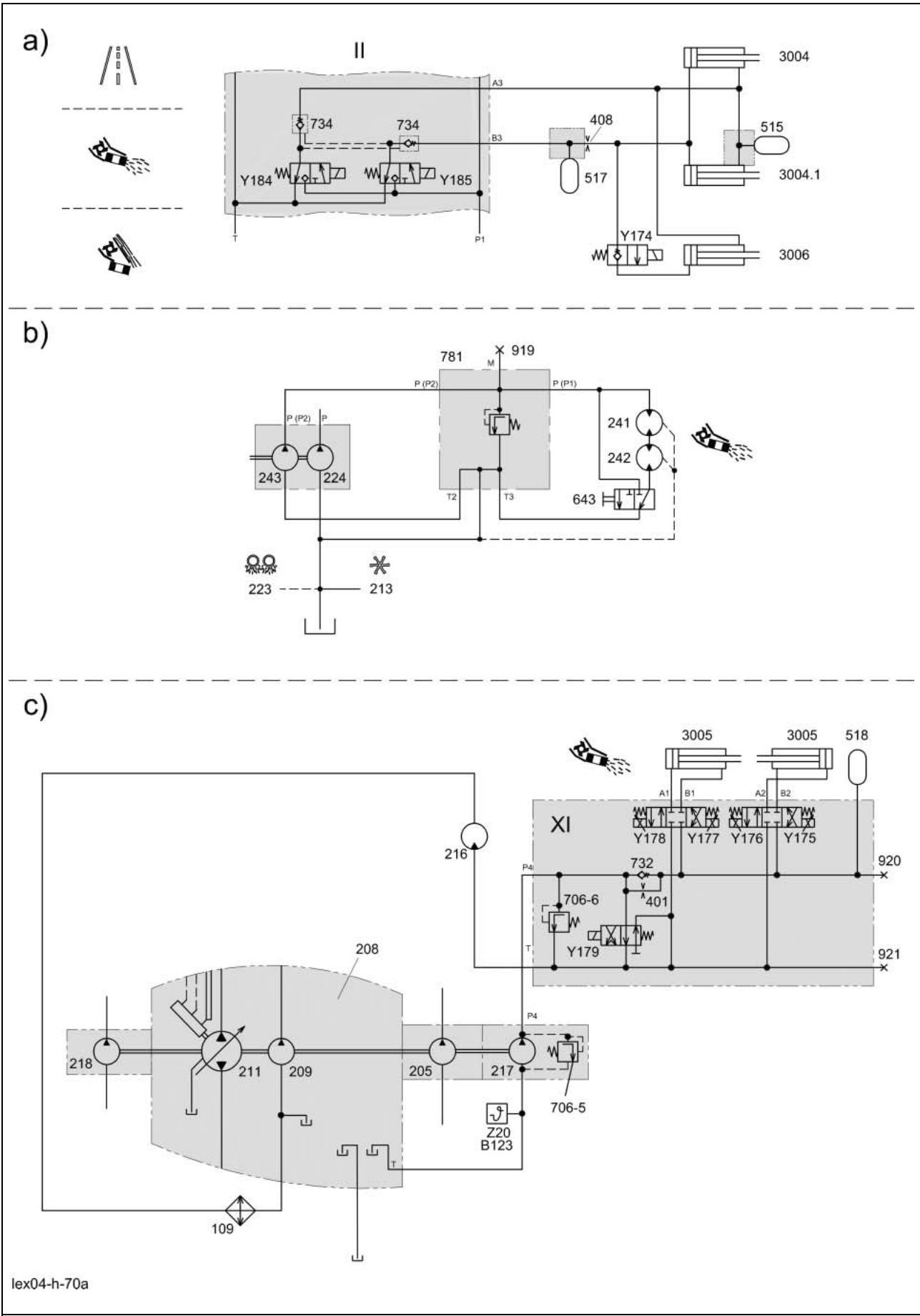
<b>6.3.1</b>	<b>Radial spreader circuit diagram.....</b>	<b>6-26</b>
<b>6.3.2</b>	<b>Radial spreader working/transport position.....</b>	<b>6-28</b>
	4/3 way solenoid valve with lock-up valve unit .....	6-28
	Hydraulic cylinders .....	6-30
	Accumulator .....	6-32
<b>6.3.3</b>	<b>Radial spreader transport position.....</b>	<b>6-34</b>
	2/2 way solenoid valve .....	6-34
	Hydraulic cylinders .....	6-36
<b>6.3.4</b>	<b>Radial spreader - deflector drive.....</b>	<b>6-38</b>
	Valve block .....	6-38
	Hydraulic cylinder .....	6-40



### **6.3.1**

#### **Radial spreader circuit diagram**

6.3.1 Radial spreader circuit diagram



Key to diagram:

109	Hydraulic system oil cooler
205	Working hydraulics pump
208	Ground drive pump
209	Ground drive feed pump
211	Ground drive variable displacement pump
213	Reel drive pump
216	Radiator chaff screen motor
217	Radiator chaff screen pump
218	Steering hydraulics pump
223	Chaff / straw spreader drive motor
224	Chaff / straw spreader drive pump
241	Radial spreader disc drive motor, left
242	Radial spreader disc drive motor, right
243	Radial spreader disc drive pump
3004	Radial spreader working/swathing position
3005	Swing radial spreader deflector
3006	Radial spreader transport position
401	Orifice plate A
408	Orifice plate H ..... 1.2 mm
515	Accumulator ..... 0.075 l / 60 bar
517	Accumulator working position ..... 0.075 l / 60 bar
518	Deflector drive accumulator ..... 0.075 l / 60 bar
643	Radial spreader disc drive shut-off valve
706-5	Pressure relief valve ..... 150 bar
706-6	Pressure relief valve ..... 80 bar
732	Non-return valve
734	Lock-up valve unit (non-return valve)
781	Radial spreader disc drive pressure relief valve 180 bar
919	Radial spreader disc drive
920	Radial spreader deflector drive
921	Radial spreader rotary chaff screen drive
B123	Hydraulic oil temperature sensor
Y174	Radial spreader transport position
Y175	Swing in left radial spreader deflector
Y176	Swing out left radial spreader deflector
Y177	Swing in right radial spreader deflector
Y178	Swing out right radial spreader deflector
Y179	Radial spreader deflector drive ON/OFF
Y184	Radial spreader swathing position
Y185	Radial spreader working/transport position
Z20	Hydraulic oil temperature switch
II	Working hydraulics valve block
XI	Swing radial spreader deflector valve block
a)	Swing radial spreader to working/swathing position, transport position
b)	Radial spreader disc drive
c)	Swing radial spreader deflector

**Key to diagram:**

A	Consumer port
B	Consumer port
P	Pump port
P1	Pump via master valve port
P4	Rotary chaff screen pump port
T	Tank port



**Key to diagram:**

3004	Radial spreader working/swathing position
3006	Radial spreader transport position
408	Orifice plate H ..... 1.2 mm
515	Accumulator ..... 0.075 l / 60 bar
517	Accumulator working position ..... 0.075 l / 60 bar
636	Concave overload system shut-off valve
734	Non-return valve (Lock-up valve unit)
759	One-way restrictor valve, two-sided
927	Concave overload system pressure gauge
Y17	Concave narrow solenoid valve
Y18	Concave wide solenoid valve
Y19	Threshing drum variable-speed drive slow solenoid valve
Y20	Threshing drum variable-speed drive fast solenoid valve
Y33	Grain tank unloading tube swing out solenoid valve
Y34	Grain tank unloading tube swing in solenoid valve
Y174	Radial spreader transport position
Y184	Radial spreader swathing position
Y185	Radial spreader working/transport position
II	Working hydraulics valve block LEXION 580
T	Tank port
P1	Pump via master valve port
A3	Hydraulic cylinder port Radial spreader in swathing position
B3	Hydraulic cylinder port Radial spreader in working/transport position

**Description of function:****Swathing position**

When the radial spreader is in transport position, energizing the radial spreader swathing position solenoid valve (Y184) first retracts the radial spreader transport position hydraulic cylinder (3006) and then the radial spreader working/swathing position hydraulic cylinders (3004).

**Working position**

Energizing the radial spreader working/transport position solenoid valve (Y185) extends the radial spreader working/swathing position hydraulic cylinders (3004).

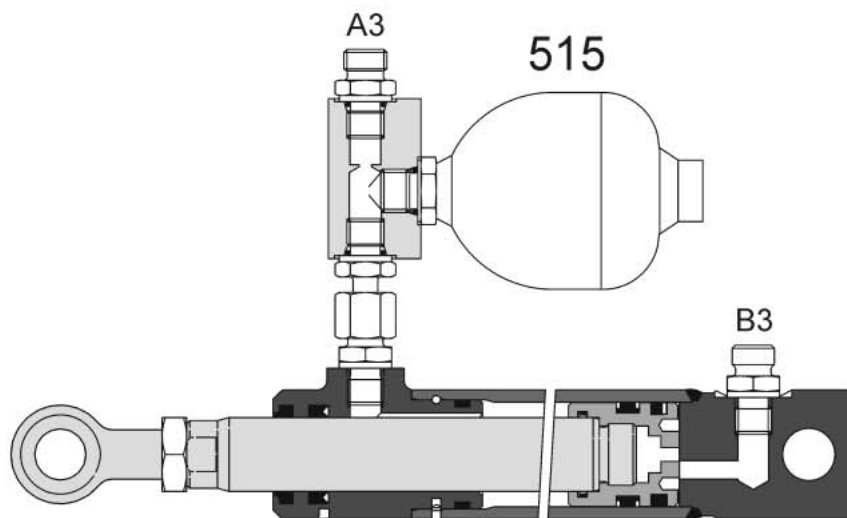
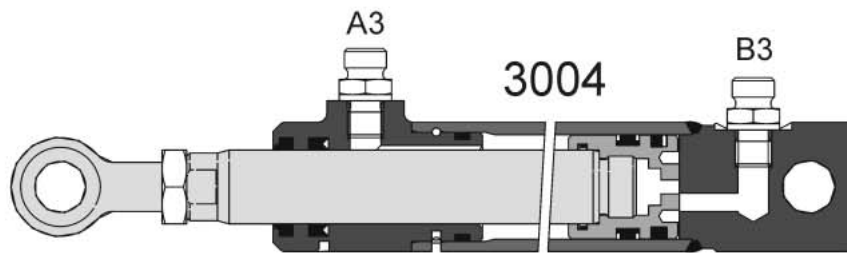
Note: When pressing the straw chopper in working position switch (U13), the radial spreader changes from the working to the swathing position and vice versa – toggle function (see also electric circuit diagram no. 19).

**Transport position**

By energizing the radial spreader working/transport position (Y185) and radial spreader transport position (Y174) solenoid valves, the radial spreader is moved to transport position.

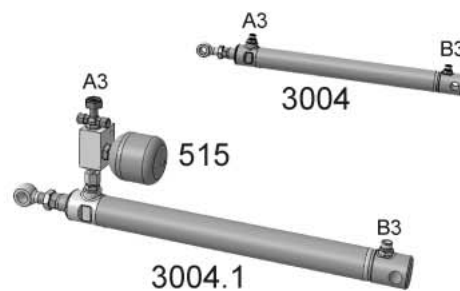
**Radial spreader working/transport position**

Hydraulic cylinders

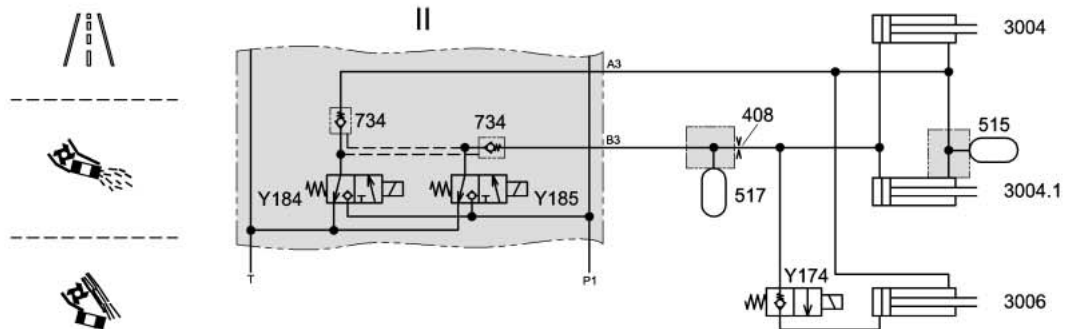


H 1220.0

3004.1



a)



400729

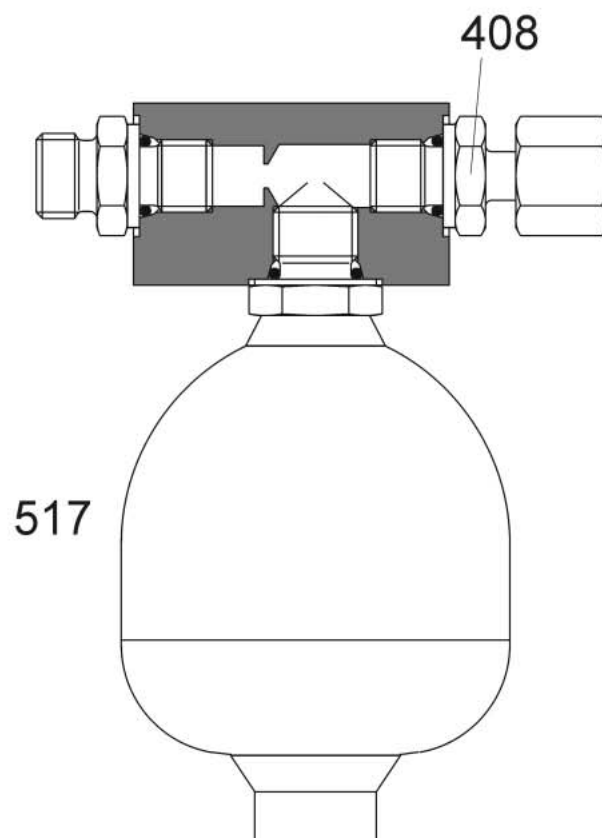


**Key to diagram:**

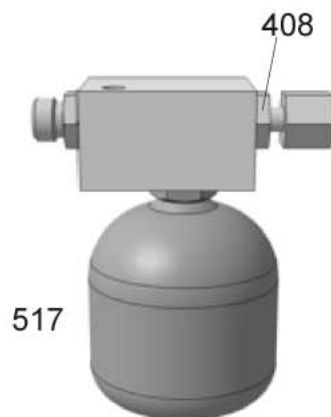
3004	Radial spreader working/swathing position
3006	Radial spreader transport position
408	Orifice plate H ..... 1.2 mm
515	Accumulator ..... 0.075 l / 60 bar
517	Accumulator working position ..... 0.075 l / 60 bar
734	Non-return valve (Lock-up valve unit)
Y174	Radial spreader transport position
Y184	Radial spreader swathing position
Y185	Radial spreader working/transport position
II	Working hydraulics valve block LEXION 580
T	Tank port
P1	Pump via master valve port
A3	Hydraulic cylinder port Radial spreader in swathing position
B3	Hydraulic cylinder port Radial spreader in working/transport position

**Radial spreader working/transport position**

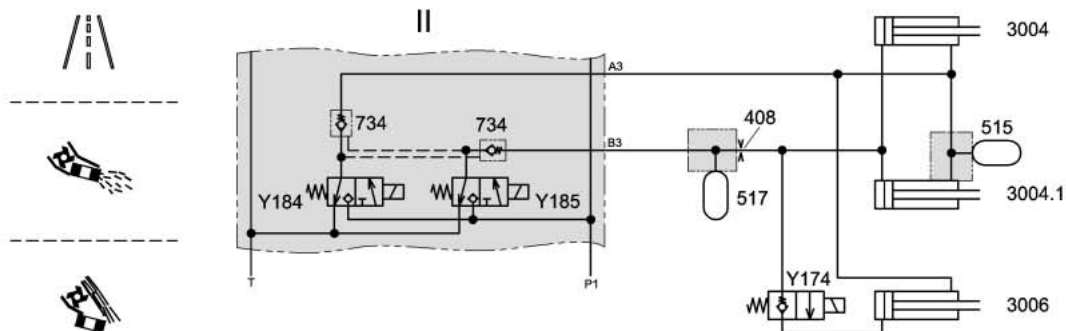
Accumulator



H 1223.0



a)

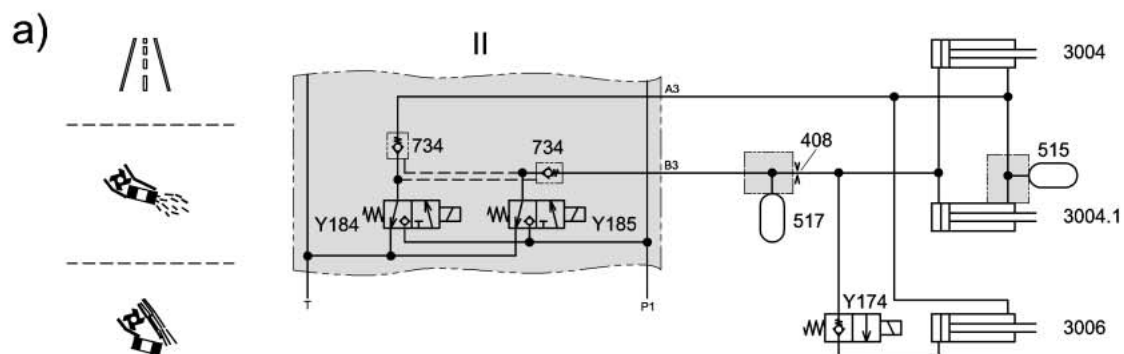
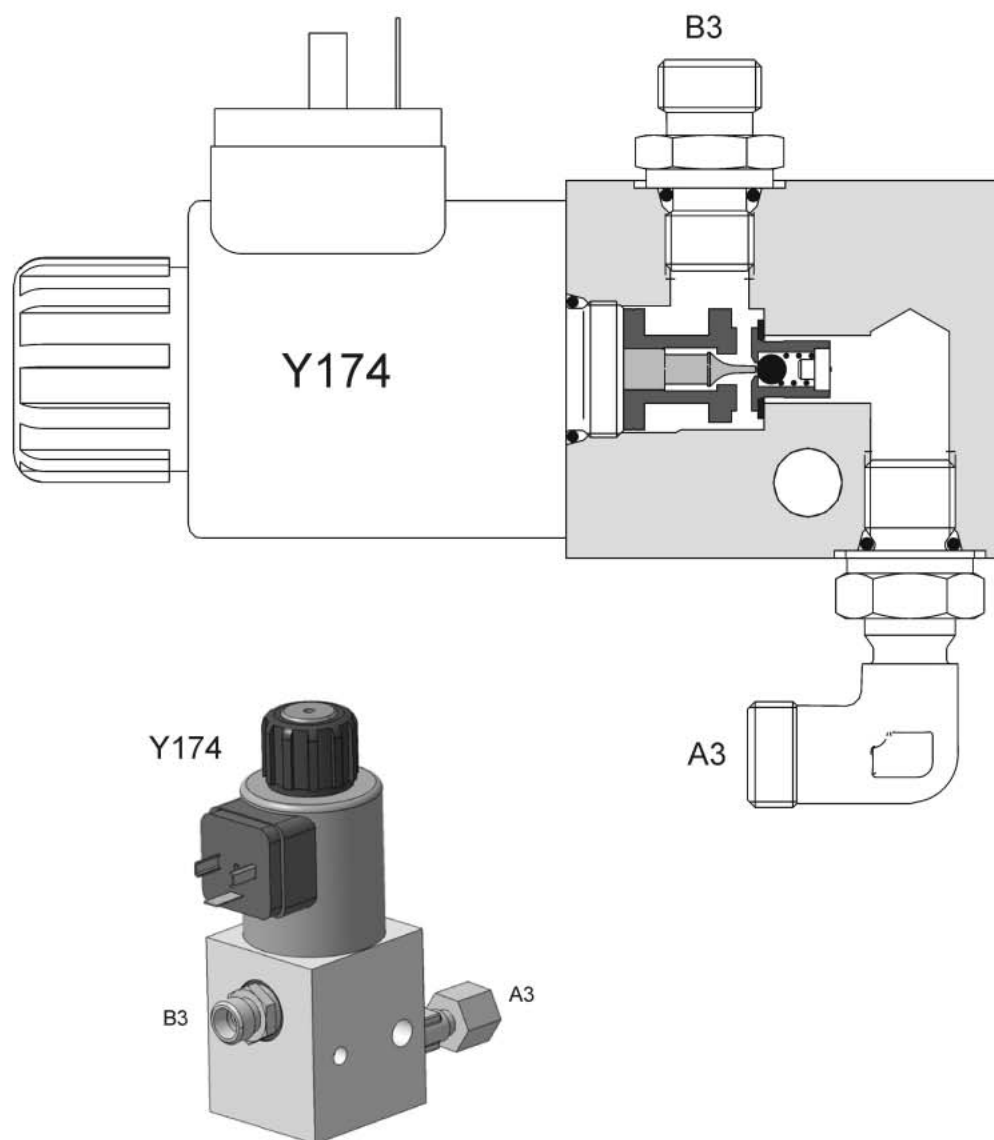


400734

**Key to diagram:**

3004	Radial spreader working/swathing position
3006	Radial spreader transport position
408	Orifice plate H ..... 1.2 mm
515	Accumulator ..... 0.075 l / 60 bar
517	Accumulator working position ..... 0.075 l / 60 bar
734	Non-return valve (Lock-up valve unit)
Y174	Radial spreader transport position
Y184	Radial spreader swathing position
Y185	Radial spreader working/transport position
II	Working hydraulics valve block LEXION 580
T	Tank port
P1	Pump via master valve port
A3	Hydraulic cylinder port Radial spreader in swathing position
B3	Hydraulic cylinder port Radial spreader in working/transport position

### 6.3.3 Radial spreader transport position 2/2 way solenoid valve



400733

**Key to diagram:**

3004	Radial spreader working/swathing position
3006	Radial spreader transport position
408	Orifice plate H ..... 1.2 mm
515	Accumulator ..... 0.075 l / 60 bar
517	Accumulator working position ..... 0.075 l / 60 bar
734	Non-return valve (Lock-up valve unit)
Y174	Radial spreader transport position
Y184	Radial spreader swathing position
Y185	Radial spreader working/transport position
II	Working hydraulics valve block LEXION 580
T	Tank port
P1	Pump via master valve port
A3	Hydraulic cylinder port Radial spreader in swathing position
B3	Hydraulic cylinder port Radial spreader in working/transport position

**Description of function:**

Transport position

By energizing the radial spreader working/transport position (Y185) and radial spreader transport position (Y174) solenoid valves, the radial spreader is moved to transport position.

**Radial spreader transport position**

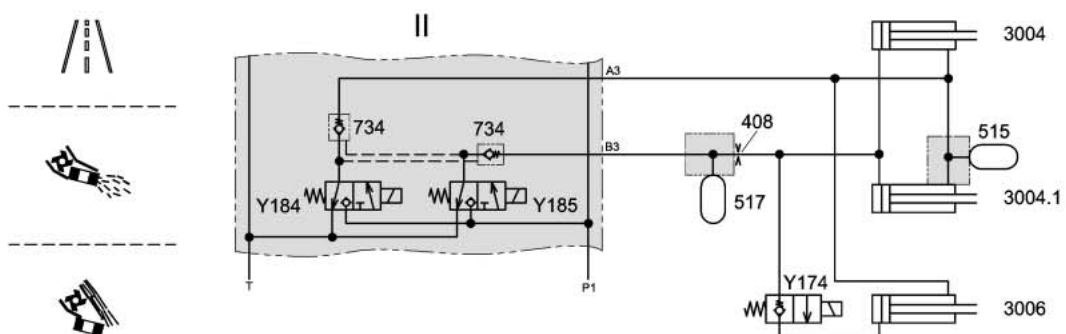
Hydraulic cylinders



H 1221.0



a)



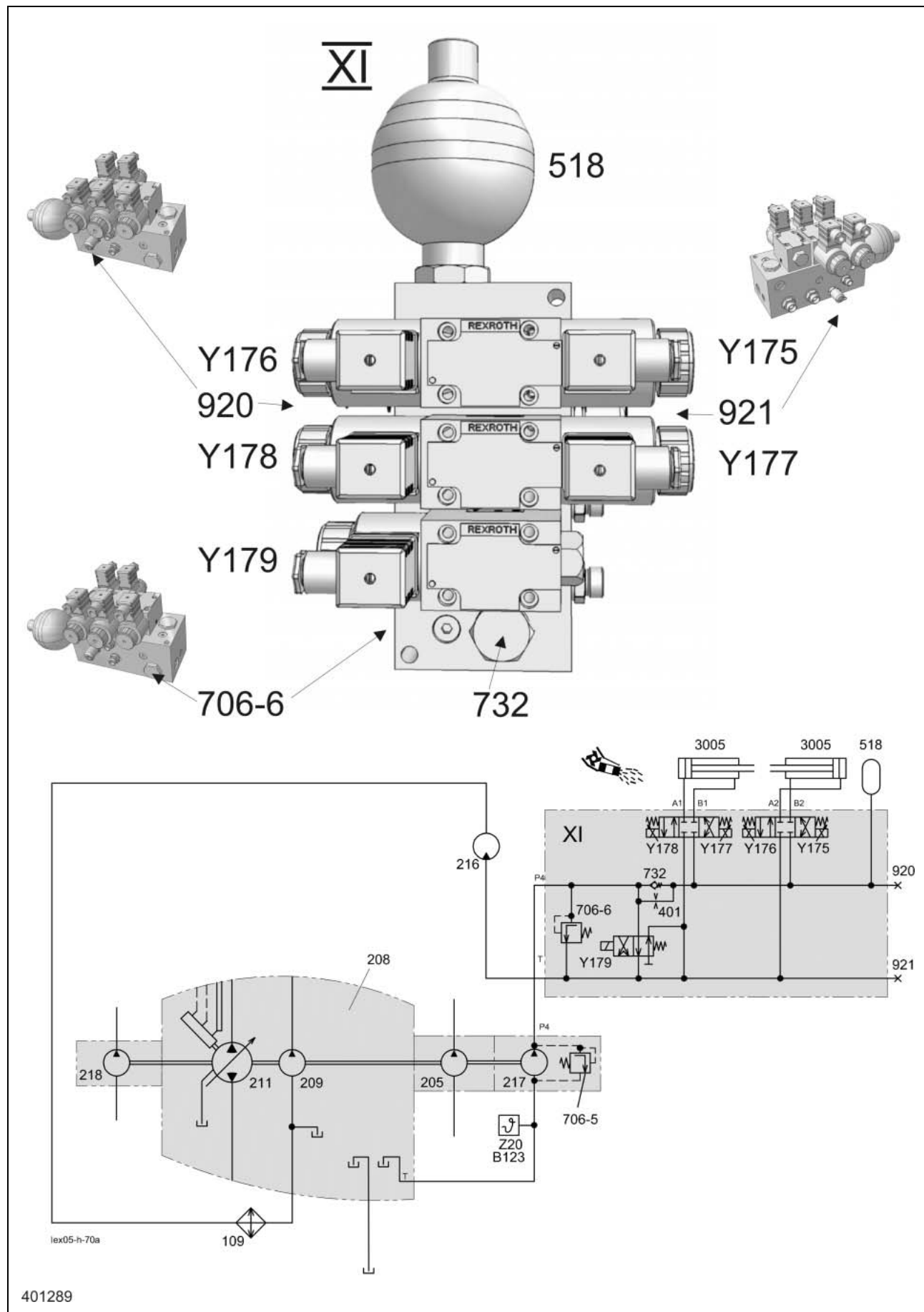
400732

**Key to diagram:**

3004	Radial spreader working/swathing position
3006	Radial spreader transport position
408	Orifice plate H ..... 1.2 mm
515	Accumulator ..... 0.075 l / 60 bar
517	Accumulator working position ..... 0.075 l / 60 bar
734	Non-return valve (Lock-up valve unit)
Y174	Radial spreader transport position
Y184	Radial spreader swathing position
Y185	Radial spreader working/transport position
II	Working hydraulics valve block LEXION 580
T	Tank port
P1	Pump via master valve port
A3	Hydraulic cylinder port Radial spreader in swathing position
B3	Hydraulic cylinder port Radial spreader in working/transport position

## 6.3.4 Radial spreader - deflector drive

Valve block

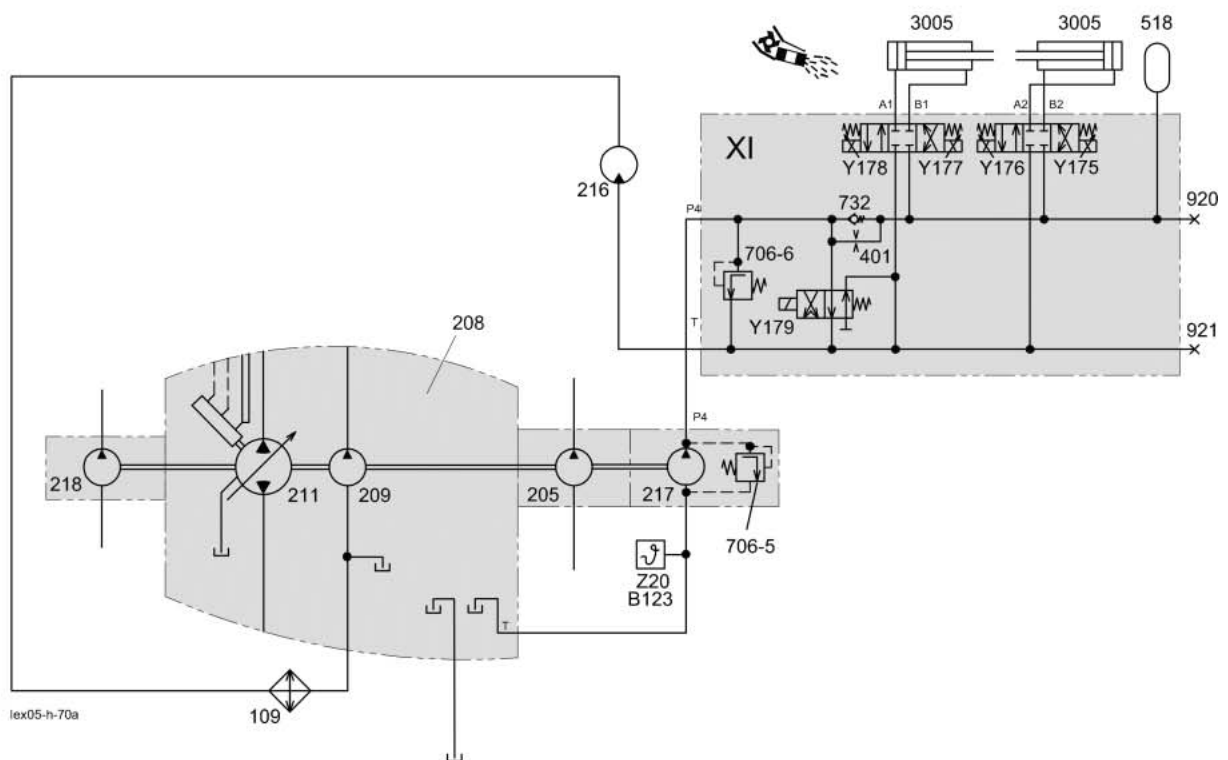
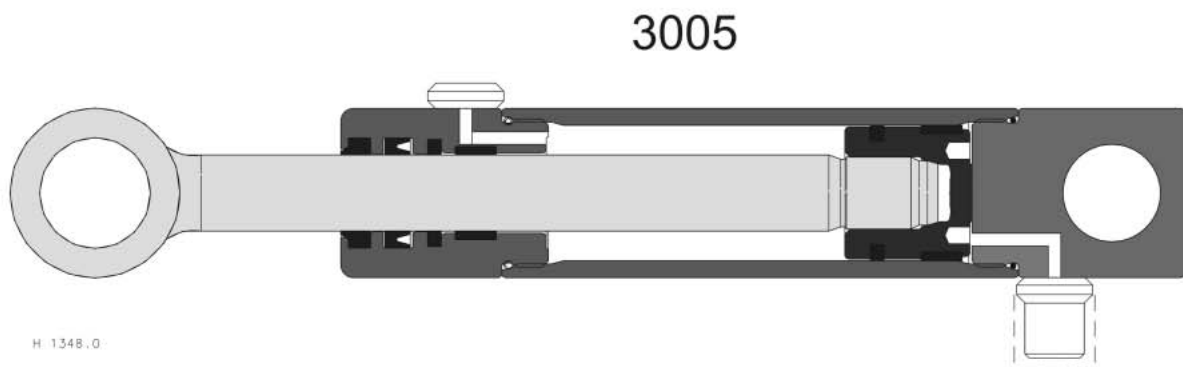




**Key to diagram:**

109	Hydraulic system oil cooler
205	Working hydraulics pump
208	Ground drive pump
209	Ground drive feed pump
211	Ground drive variable-displacement pump
216	Radiator chaff screen motor
217	Radiator chaff screen pump
218	Steering hydraulics pump
3005	Swing radial spreader deflector
401	Orifice plate A
518	Deflector drive accumulator ..... 0.075 l / 60 bar
706-5	Pressure relief valve ..... 150 bar
706-6	Pressure relief valve ..... 80 bar
732	Non-return valve
920	Radial spreader deflector drive
921	Radial spreader rotary chaff screen drive
B123	Hydraulic oil temperature sensor
Y175	Swing in left radial spreader deflector
Y176	Swing out left radial spreader deflector
Y177	Swing in right radial spreader deflector
Y178	Swing out right radial spreader deflector
Y179	Radial spreader deflector drive ON/OFF
XI	Swing radial spreader deflector valve block
A	Consumer port
B	Consumer port
P	Pump port
T	Tank port

**Radial spreader - deflector drive**  
Hydraulic cylinder



401288

**Key to diagram:**

109	Hydraulic system oil cooler
205	Working hydraulics pump
208	Ground drive pump
209	Ground drive feed pump
211	Ground drive variable-displacement pump
216	Radiator chaff screen motor
217	Radiator chaff screen pump
218	Steering hydraulics pump
3005	Swing radial spreader deflector
401	Orifice plate A
518	Deflector drive accumulator ..... 0.075 l / 60 bar
706-5	Pressure relief valve ..... 150 bar
706-6	Pressure relief valve ..... 80 bar
732	Non-return valve
920	Radial spreader deflector drive
921	Radial spreader rotary chaff screen drive
B123	Hydraulic oil temperature sensor
Y175	Swing in left radial spreader deflector
Y176	Swing out left radial spreader deflector
Y177	Swing in right radial spreader deflector
Y178	Swing out right radial spreader deflector
Y179	Radial spreader deflector drive ON/OFF
XI	Swing radial spreader deflector valve block
A	Consumer port
B	Consumer port
P	Pump port
T	Tank port



**7****Radiator Cleaning**

<b>7.1</b>	<b>Rotary Chaff Screen .....</b>	<b>7-3</b>
<b>7.2</b>	<b>Planar rotary chaff screen cleaning .....</b>	<b>7-11</b>



## 7.1

### Rotary Chaff Screen

7.1.1	Rotary Chaff Screen Circuit Diagram .....	7-6
7.1.2	Rotary Chaff Screen Drive .....	7-8
	Pump with integrated pressure relief valve .....	7-8

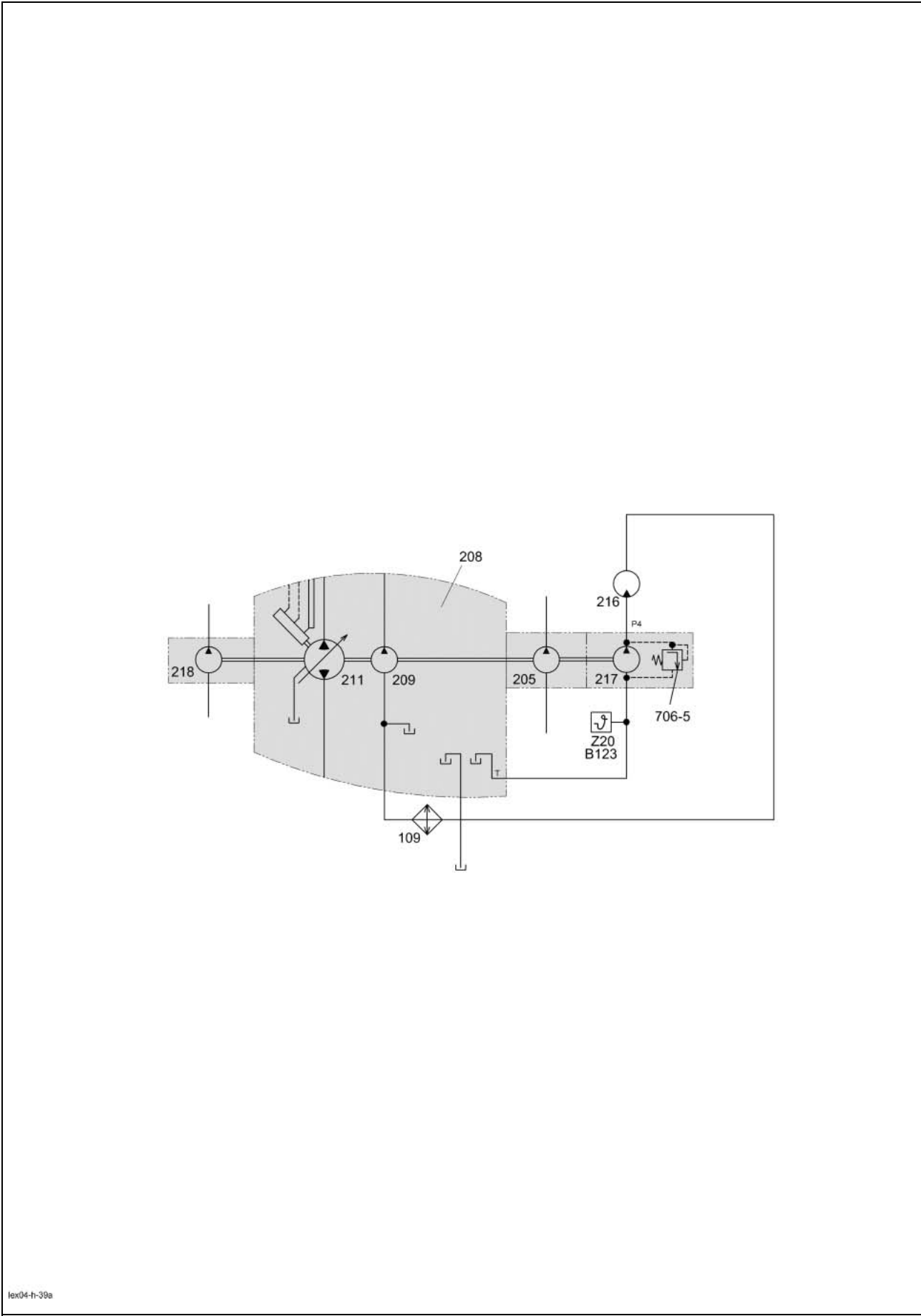




### **7.1.1**

**Circuit Diagram  
Rotary Chaff Screen**

7.1.1 Rotary Chaff Screen Circuit Diagram



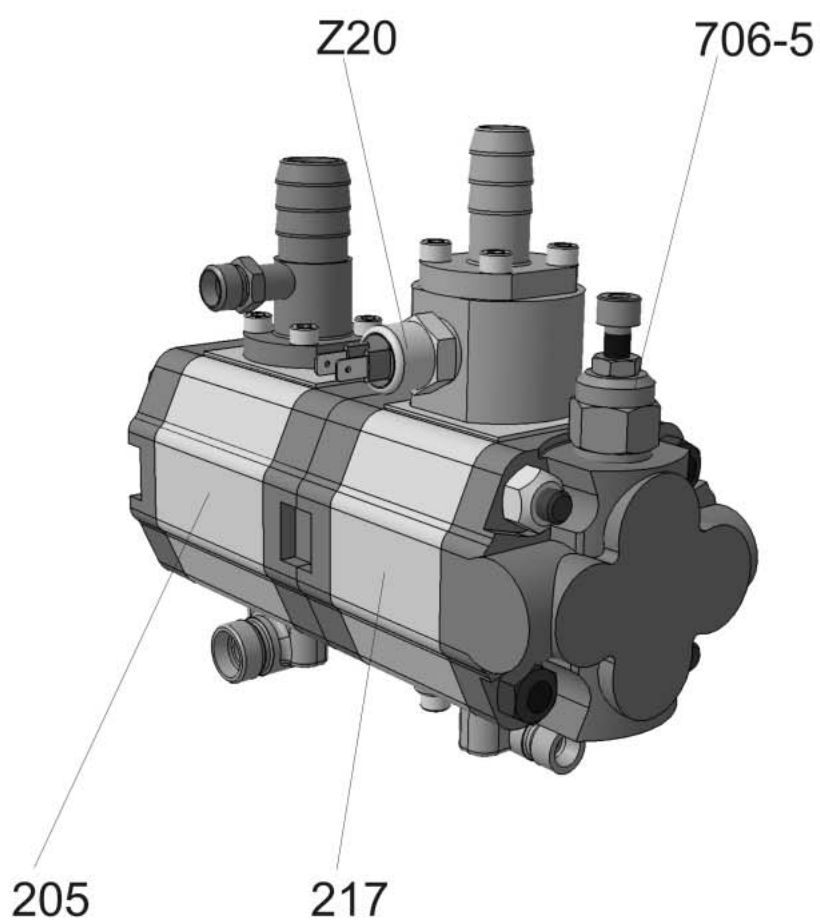
Key to diagram:

109	Hydraulic system oil cooler
205	Working hydraulics pump..... 14 / 19 cm <sup>3</sup> /rev.
208	Ground drive pump ..... 90R100/130
209	Ground drive feed pump ..... 20 / 26 cm <sup>3</sup> /rev.
211	Ground drive variable displacement pump ..... 100 / 130 cm <sup>3</sup> /rev.
216	Rotary chaff screen drive motor..... 12.5 cm <sup>3</sup> /rev.
217	Rotary chaff screen drive pump..... 5,5 cm <sup>3</sup> /rev.
218	Steering hydraulics pump ..... 8 / 11 cm <sup>3</sup> /rev.
706-5	Rotary chaff screen pressure relief valve ... 150 bar
Z20	Hydraulic oil temperature actual value switch
P4	Rotary chaff screen pump port
T	Tank port

**Notes:**

**7.1.2 Rotary Chaff Screen Drive**

Pump with integrated pressure relief valve



400520

**Key to diagram:**

205	Working hydraulics pump.....	14 / 19 cm <sup>3</sup> /rev.
217	Rotary chaff screen drive pump.....	5,5 cm <sup>3</sup> /rev.
706-5	Rotary chaff screen pressure relief valve .....	150 bar
Z20	Hydraulic oil temperature actual value switch	

**Description of function:**

## Pressure relief valve

The pressure relief valve (706-5) limits the pressure in the hydraulic system and protects the connected mechanical components against damage due to excessive forces.  
The spring in the pressure relief valve (706) is pre-stressed for a system pressure of 150 bar.



## 7.2

### **Planar rotary chaff screen cleaning**

<b>7.2.1</b>	<b>Planar rotary chaff screen cleaning circuit diagram .....</b>	<b>7-14</b>
<b>7.2.2</b>	<b>Planar rotary chaff screen cleaning drive .....</b>	<b>7-16</b>
	Pump with integrated pressure relief valve .....	7-16

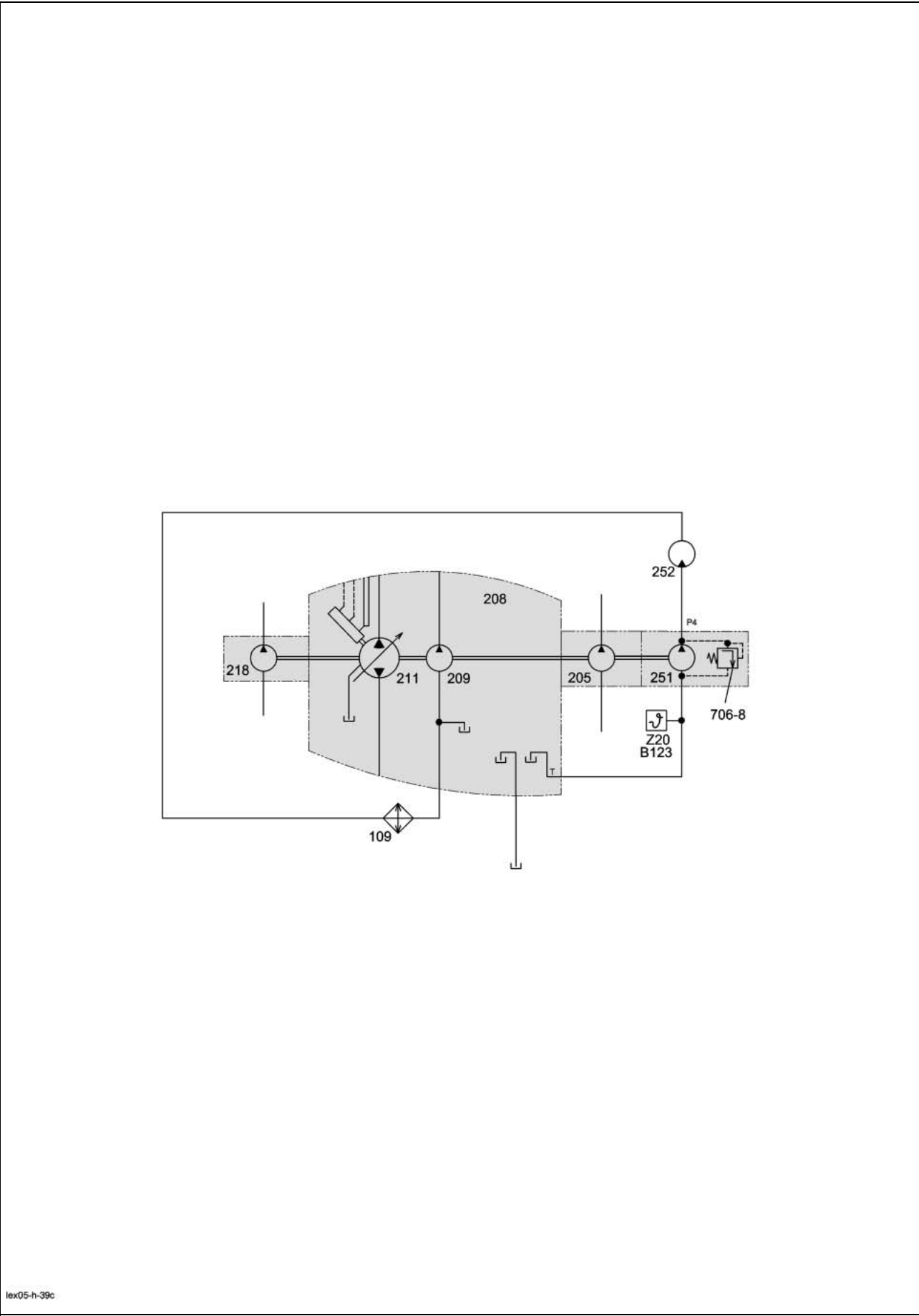




### **7.2.1**

**Planar rotary chaff screen cleaning  
circuit diagram**

7.2.1 Planar rotary chaff screen cleaning circuit diagram

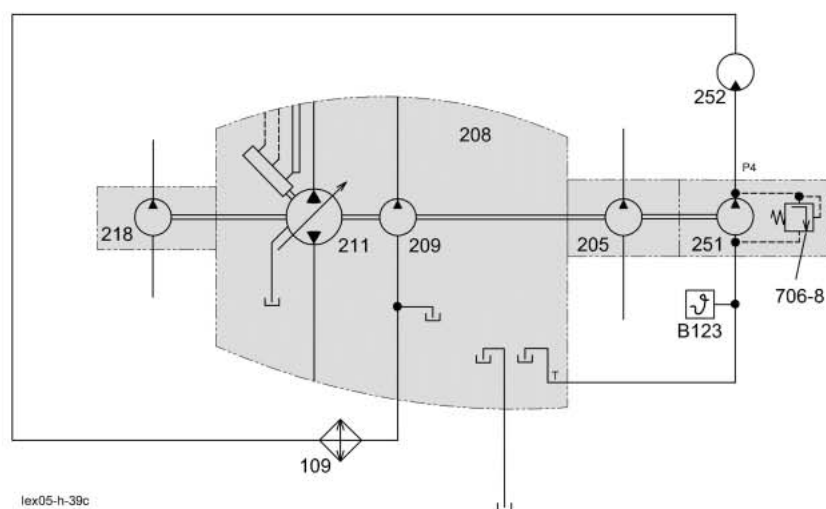
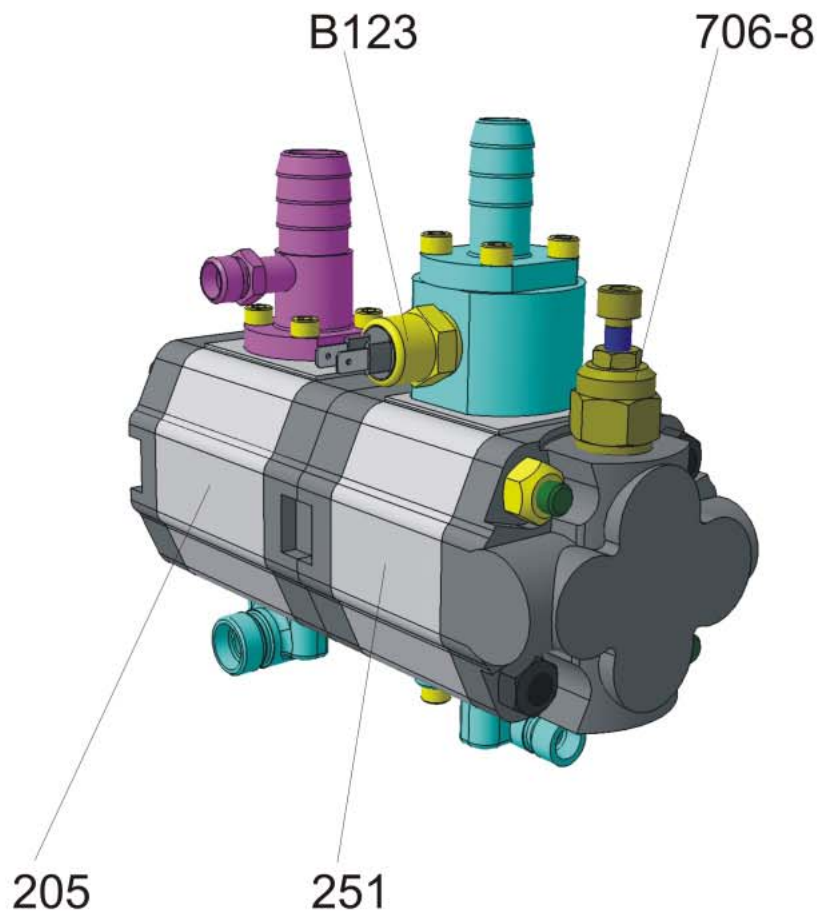


- Key to diagram:
- |       |  |
|-------|--|
| 109   | Hydraulic system oil cooler  |
| 205   | Working hydraulics pump ..... 14 / 19 cm <sup>3</sup> /rev.                  |
| 208   | Ground drive pump..... 90R100/130  |
| 209   | Ground drive feed pump..... 20 / 26 cm <sup>3</sup> /rev.                    |
| 211   | Ground drive variable-displacement pump .... 100 / 130 cm <sup>3</sup> /rev. |
| 251   | Rotary chaff screen cleaning pump..... ?? cm <sup>3</sup> /rev.              |
| 252   | Rotary chaff screen cleaning motor..... ?? cm <sup>3</sup> /rev.             |
| 218   | Steering hydraulics pump ..... 8 / 11 cm <sup>3</sup> /rev.                  |
| 706-5 | Rotary chaff screen pressure relief valve ..... ?? bar                       |
| Z20   | Hydraulic oil temperature actual value switch                                |
| P4    | Rotary chaff screen pump port  |
| T     | Tank port  |

**Notes:**

### 7.2.2 Planar rotary chaff screen cleaning drive

Pump with integrated pressure relief valve



lex05-h-39c

401313

**Key to diagram:**

205	Working hydraulics pump.....	14 / 19 cm <sup>3</sup> /rev.
251	Rotary chaff screen cleaning pump	
706-8	Rotary chaff screen cleaning pressure relief valve	150 bar
B123	Hydraulic oil temperature sensor	

**Description of function:**

## Pressure relief valve

The pressure relief valve (706-8) limits the pressure in the hydraulic system and protects the connected mechanical components against damage due to excessive forces.  
The spring in the pressure relief valve (706-8) is pre-stressed for a system pressure of 150 bar.



**8****Ground Drive  
Hydraulics**

<b>8.1</b>	<b>Hydrostatic Ground Drive - Mechanical Control .....</b>	<b>8-3</b>
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## 8.1

### Hydrostatic Ground Drive - Mechanical Control

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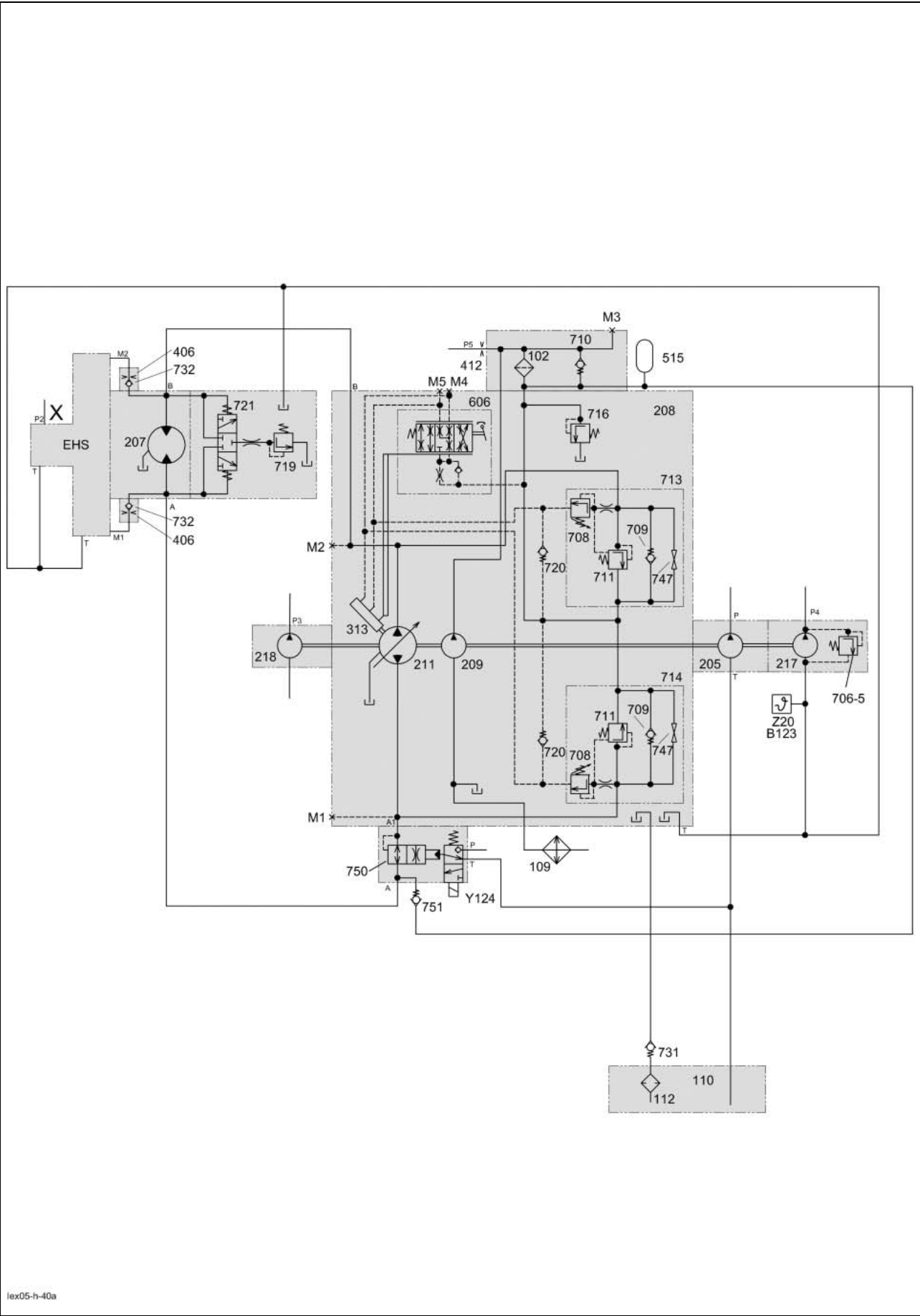
### **8.1.1**

#### **Hydrostatic Ground Drive Circuit Diagram**

Mechanical control

up to serial no. 58600336,  
58500162,  
58400895,  
58300298,  
58200051,  
58100037,  
58000028

8.1.1   Hydrostatic Ground Drive Circuit Diagram - Mechanical Control  
up to serial no. 58600336,58500162,58400895,58300298,58200051,58100037,58000028



- Key to diagram:
- |       |  |                                 |
|-------|--|---------------------------------|
| 102   | Filter cartridge.....                                      | 10 µm                           |
| 109   | Oil cooler   |                                 |
| 110   | Oil tank   |                                 |
| 112b  | Ground drive and steering sieve filter                     |                                 |
| 205   | Working hydraulics gear pump .....                         | 19 / 14 cm <sup>3</sup> /rev.   |
| 207   | Axial-piston fixed displacement motor .....                | 100 cm <sup>3</sup> /rev.       |
| 208   | Ground drive variable displacement pump ....               | 90 R 100/130                    |
| 209   | Feed pump.....   | 26 cm <sup>3</sup> /rev.        |
| 211   | Axial-piston displacement pump .....                       | 100 / 130 cm <sup>3</sup> /rev. |
| 217   | Rotary chaff screen drive pump .....                       | 5.5 cm <sup>3</sup> /rev.       |
| 218   | Steering gear pump .....                                   | 11 cm <sup>3</sup> /rev.        |
| 313   | Servo cylinder   |                                 |
| 406   | Orifice plate.....   | Ø 0.8 mm                        |
| 412   | Orifice plate.....   | Ø 2 mm                          |
| 515   | Accumulator.....   | 0.75 l                          |
| 606   | Servo control valve  |                                 |
| 706-5 | Pressure relief valve                                      |                                 |
| 708   | Pressure cut-off valve .....                               | 420 <sup>+30</sup> bar          |
| 709   | Feed valve .....   | 0.7 bar                         |
| 710   | Bypass valve.....  | 3 bar                           |
| 711   | High pressure relief valve .....                           | 430 <sup>+30</sup> bar          |
| 713   | Backward multi-function valve                              |                                 |
| 714   | Forward multi-function valve                               |                                 |
| 716   | Feed pressure relief valve .....                           | 30±2.5 bar                      |
| 719   | Purge valve  |                                 |
| 720   | Pre-stress valve .....                                     | 7 bar                           |
| 721   | Shuttle valve  |                                 |
| 731   | Return line valve (non-return valve)                       |                                 |
| 732   | Non-return valve   |                                 |
| 747   | Short-circuit valve  |                                 |
| 750   | Brake restrictor valve                                     |                                 |
| 751   | External feed valve (non-return valve)                     |                                 |
| Y124  | Ground drive hydraulic motor brake restrictor (HBM)        |                                 |
| M1    | High pressure forward measuring port                       |                                 |
| M2    | High pressure backward measuring port                      |                                 |
| M3    | Feed pressure measuring port                               |                                 |
| M4    | Actuating pressure backward measuring port                 |                                 |
| M5    | Actuating pressure forward measuring port                  |                                 |
| X     | Electro-hydraulic gearshift (EHS) valve unit               |                                 |
| EHS   | Electro-hydraulic gearshift                                |                                 |
| A     | High pressure forward port                                 |                                 |
| B     | High pressure backward port                                |                                 |
| P     | Working hydraulics pump port                               |                                 |
| P3    | Steering pump port   |                                 |
| P4    | Rotary chaff screen pump port                              |                                 |
| P5    | Low-pressure hydraulics port                               |                                 |
| R     | Steering hydraulics / Rotary chaff screen return line port |                                 |
| T     | Tank port  |                                 |

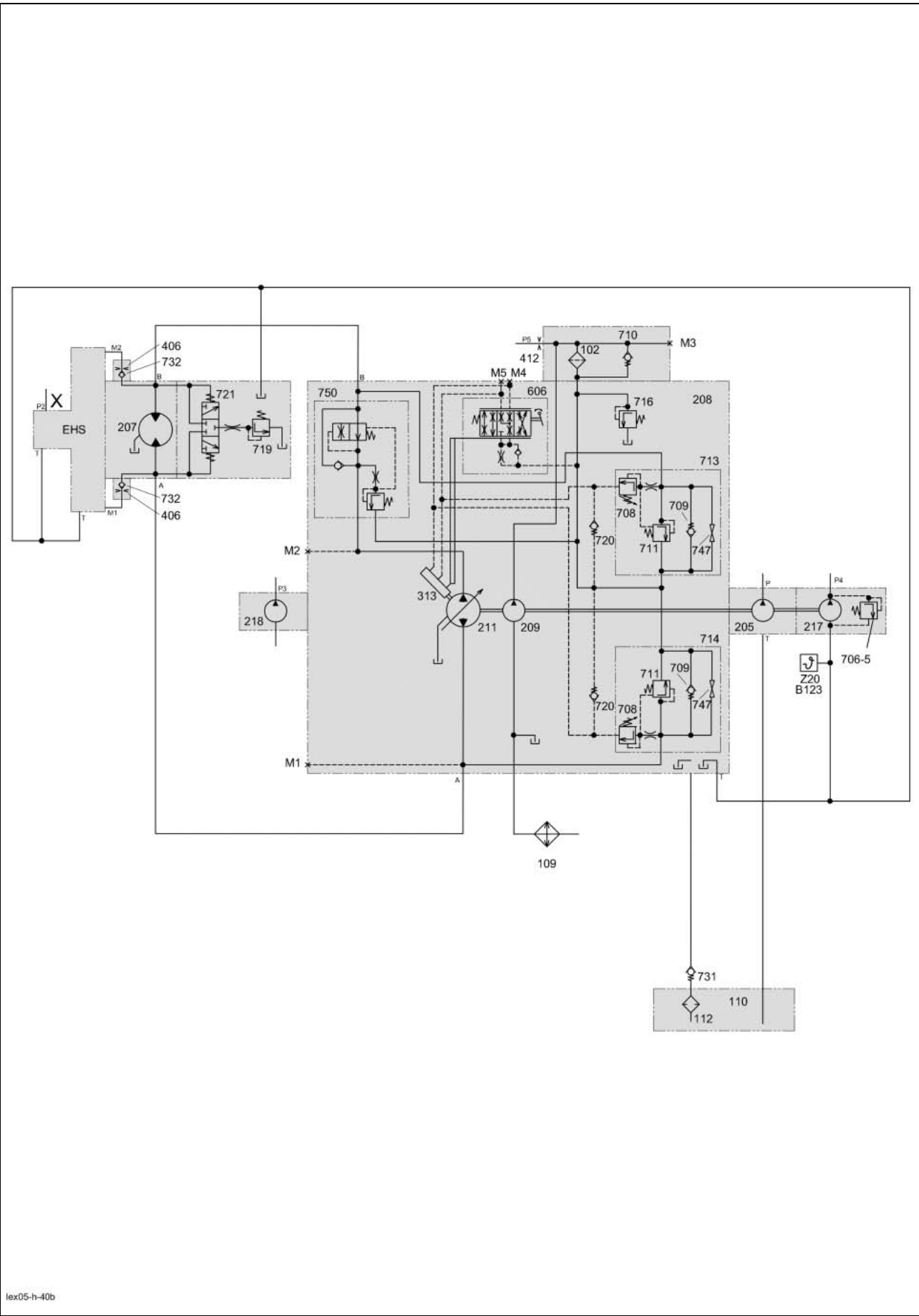
## **8.1.2**

### **Hydrostatic Ground Drive Circuit Diagram**

Mechanical control

from serial no. 58600337,  
58500163,  
58400896,  
58300299,  
58200052,  
58100038,  
58000029

8.1.2   Hydrostatic Ground Drive Circuit Diagram - Mechanical Control  
from serial no. 58600337,58500163,58400896,58300299,58200052,58100038,58000029



- Key to diagram:
- 102

Filter cartridge..... 10 µm
- 109

Oil cooler
- 110

Oil tank
- 112b

Ground drive and steering sieve filter
- 205

Working hydraulics gear pump ..... 19 / 14 cm<sup>3</sup>/rev.
- 207

Axial-piston fixed displacement motor ..... 100 cm<sup>3</sup>/rev.
- 208

Ground drive variable displacement pump .... 90 R 100/130
- 209

Feed pump..... 26 cm<sup>3</sup>/rev.
- 211

Axial-piston displacement pump ..... 100 / 130 cm<sup>3</sup>/rev.
- 217

Rotary chaff screen drive pump ..... 5.5 cm<sup>3</sup>/rev.
- 218

Steering gear pump ..... 11 cm<sup>3</sup>/rev.
- 313

Servo cylinder
- 406

Orifice plate..... Ø 0.8 mm
- 412

Orifice plate..... Ø 2 mm
- 515

Accumulator..... 0.75 l
- 606

Servo control valve
- 706-5

Pressure relief valve
- 708

Pressure cut-off valve ..... 420<sup>+30</sup> bar
- 709

Feed valve ..... 0.7 bar
- 710

Bypass valve..... 3 bar
- 711

High pressure relief valve ..... 430<sup>+30</sup> bar
- 713

Backward multi-function valve
- 714

Forward multi-function valve
- 716

Feed pressure relief valve ..... 30±2.5 bar
- 719

Purge valve
- 720

Pre-stress valve ..... 7 bar
- 721

Shuttle valve
- 731

Return line valve (non-return valve)
- 732

Non-return valve
- 747

Short-circuit valve
- 750

Brake restrictor valve
- 751

External feed valve (non-return valve)
- M1

High pressure forward measuring port
- M2

High pressure backward measuring port
- M3

Feed pressure measuring port
- M4

Actuating pressure backward measuring port
- M5

Actuating pressure forward measuring port
- X

Electro-hydraulic gearshift (EHS) valve unit
- EHS

Electro-hydraulic gearshift
- A

High pressure forward port
- B

High pressure backward port
- P

Working hydraulics pump port
- P3

Steering pump port
- P4

Rotary chaff screen pump port
- P5

Low-pressure hydraulics port
- R

Steering hydraulics / Rotary chaff screen return line port
- T

Tank port

lex05-h-40b

**Description of function:**

Oil supply	<p>After starting the diesel engine, the steering hydraulics pump and the feed pump (209) are driven. A part of the oil quantity required on the suction side of feed pump (209) is thus fed in via the return line of steering (R) and the oil cooler (109). The feed pump (209) pumps the remaining quantity from the purge return line via the body of variable displacement pump (211) or from the tank (110).</p>
Feed pressure circuit	<p>The feed pressure builds up from the oil quantity of feed pump (209) pumped through the filter (102) against the feed pressure relief valve (716). Depending on the spring setting in valve (716), the oil flow is pre-stressed and then relieved to the tank.</p> <p>The feed pressure is applied to the servo control valve (606) and to the multifunction valves (713/714). When the variable displacement pump (211) is not swung out, the feed pressure propagates to both sides of the high-pressure circuit via the feed valves in the multifunction valves (713/714).</p>
Feed pressure relief valve	<p>After slackening off the jam nut at the feed pressure relief valve (716), the pressure setting can be corrected. One turn of the setting screw here corresponds to <b>approx. 3.5 bar</b>.</p>
Servo control	<p>The cable mounted on the ground speed control lever moves the spool in the servo control valve (606) from the neutral position to one or the other direction. Depending on the direction of travel, the servo cylinder (313) is thus pressure-loaded on one side and the other side is connected with the return line to the tank.</p> <p>The servo cylinder (313) swings the variable displacement pump (211) only by the path defined by the ground speed control lever because there is a mechanical feedback of the swing angle to the servo control valve (606). This mechanical feedback balances the spool in the servo control valve (606) and therefore the pressure level at the control edge so that the defined swing angle is maintained.</p>
High-pressure circuit	<p>As soon as the variable displacement pump (211) is swung out, an axial motion is added to the radial motion of the pump unit. This axial motion displaces the oil in the cylinder space of the rotor and thus acts on the motor unit (207) which converts this energy into a rotating motion by supporting itself against the fixed inclined disc.</p> <p>The respective suction side of the variable displacement pump (211) is pre-stressed via the feed pressure circuit and the corresponding feed valve in the multifunction valves (713/714). This ensures that the ground drive variable displacement pump (211) is sufficiently filled and that any occurring leaks are compensated.</p> <p>Since feed pressure is always available on the suction side of the variable displacement pump (211) as well as on the return flow side of the fixed displacement motor (207), this area is referred to as low-pressure side within the high-pressure circuit.</p>

**Description of function:**

Pressure cut-off	<p>When the high pressure reaches the maximum allowed value, the corresponding pressure cut-off valve in the multifunction valve (713/714) opens and relieves the pressure to the opposite side, i.e. the side of the servo cylinder (313) where actuating pressure is applied. This reset pressure is limited by the feed pressure relief valve (716) and additionally pre-stressed by pre-stress valve (720). This results in a reset pressure which is certainly higher than the actuating pressure applied on the opposite side.</p> <p>As soon as the variable displacement pump (211) swings slightly back as a result, the pressure cut-off collapses and thus the swing angle balances at the max. pressure value.</p> <p>This pressure cut-off avoids having to relieve the oil flow via a valve during the pressure relief which would heat up the oil excessively.</p>
High-pressure limitation	<p>The pressure peaks in the system which cannot be removed by the pressure cut-off are relieved to the feed pressure circuit via the high-pressure limiting valve in the multifunction valves (713/714).</p> <p>The high-pressure limitation depends on the pressure cut-off setting and cannot be tested.</p>
Multi-function valve	<p>The multifunction valve only allows measuring and adjusting the pressure cut-off. The high-pressure limitation value is <b>approx. 30 bar</b> above that of the pressure cut-off.</p> <p>After slackening off the jam nut at the multifunction valve, the pressure setting can be corrected. One turn of the setting screw here corresponds to <b>approx. 93 bar</b>.</p>
Flushing device	<p>The respective high-pressure side in the high-pressure circuit actuates the shuttle valve (721) in the fixed displacement motor (207) so the corresponding low-pressure side has a connection to the motor housing via the flush pressure control valve (719). Since the pressure setting of the flush pressure control valve (719) is lower than that of the feed pressure relief valve (716), a constant oil quantity is exchanged by the feed pump (209) via the restrictor in the flush pressure control valve (719).</p>
Flush valve	<p>The quantity flushed out by flush pressure control valve (719) is limited to <b>approx. 25 to 30 l/min</b> at rated speed and rated pressure by a restrictor bore provided in the valve insert. System-related leaks of <b>approx. 2 to 3 l/min</b> must additionally be considered for a volume flow measurement.</p>



## Accumulator

The accumulator (515) avoids a feed pressure drop due to an excessive short-term oil requirement (diesel engine or pump speed too low, simultaneous actuation of several functions in the low-pressure circuit).

Ground drive hydraulic  
motor brake restrictor  
(Y124)  
up to serial no.

The ground drive hydraulic motor brake restrictor solenoid valve (Y124) is mounted to the ground drive pump (208).

It avoids pump damage and diesel engine damage caused by overspeed. When travelling downhill, the ground drive variable displacement motor (207) delivers an increased volume flow to the ground drive variable displacement pump (211). This makes the speeds of the ground drive variable displacement pump (211) and of the diesel engine rise.

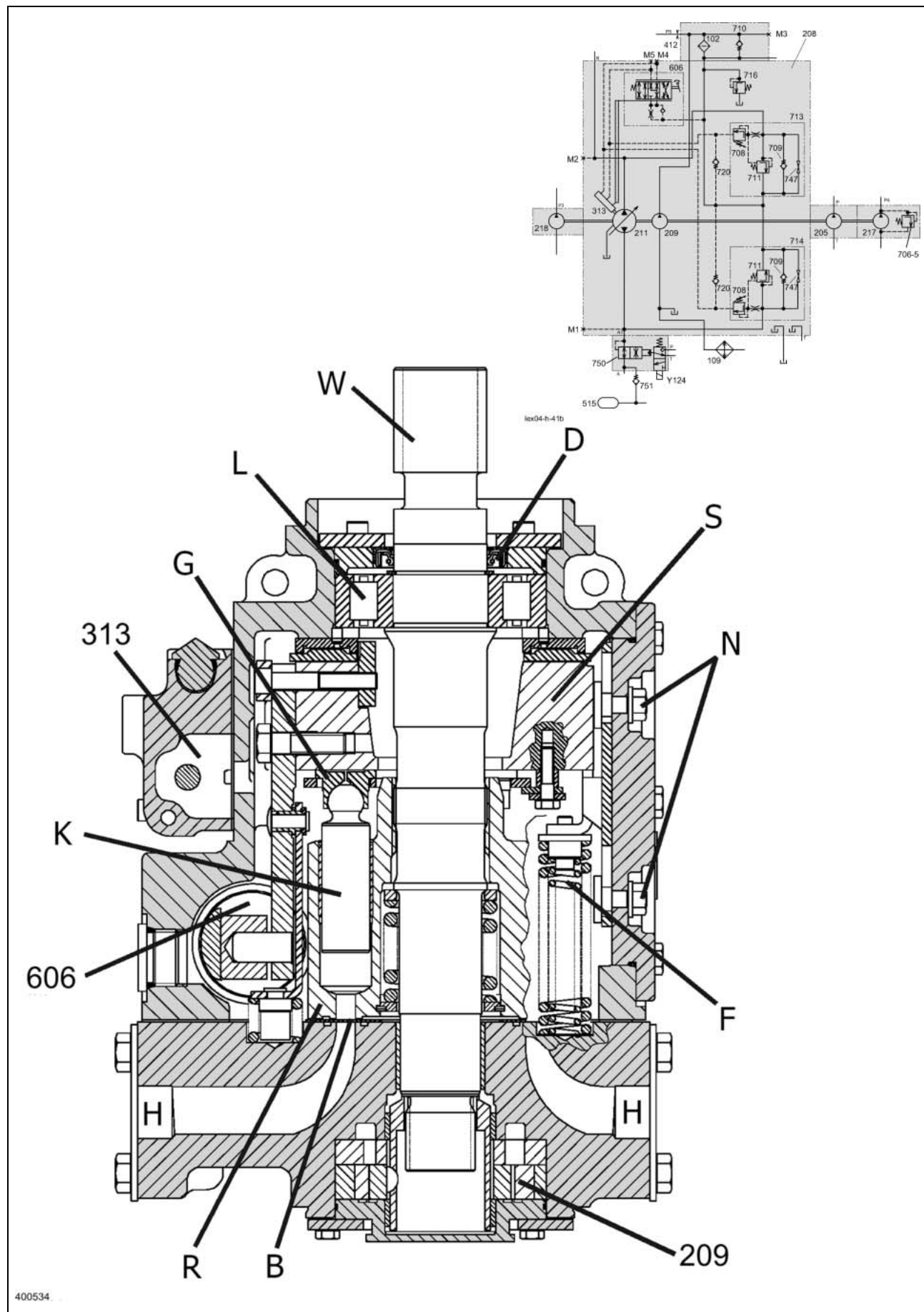
Integrated brake function  
(750)  
from serial no.

The integrated brake function (750) avoids excess speed of the hydrostatic gearbox and of the diesel engine when travelling downhill. This restrictor valve is only pressure-controlled and thus does not require any external control input. The setting of the pressure control valve is adapted to the diesel engine used!

## Pressure setting

M1	- 9/16" - 18UNF 2B, O-ring .....	30-420 <sup>+30</sup> bar
M2	- 9/16" - 18UNF 2B, O-ring .....	30-420 <sup>+30</sup> bar
M3	- 9/16" - 18UNF 2B, O-ring .....	30±2.5 bar
M4	- 9/16" - 18UNF 2B, O-ring .....	0-37±2.5 bar
M5	- 9/16" - 18UNF 2B, O-ring .....	0-37±2.5 bar

### 8.1.3 Pump Unit Series 90



**Key to diagram:**

209	Feed pump .....	26 cm <sup>3</sup>
313	Servo cylinder	
606	Servo control valve	
B	Control bottom	
D	Shaft seal	
F	Return spring	
G	Slide	
H	High pressure	
K	Piston	
L	Bearing	
N	Adjustment of mechanical neutral position	
R	Cylinder rotor	
S	Swing disc	
W	Drive shaft	

**Description of function:**

(see also 8.1.1)

As soon as the diesel engine is started, the cylinder rotor (R) as well as the feed pump (209) are driven by the nine pistons (K) arranged radially around the drive shaft (W). In this process, the pistons (K) are pressed against the swing disc (S) by means of the slides (G) due to the feed pressure applied on both sides of the high-pressure circuit (H).

The servo cylinder (313) is actuated by the servo control valve (606) so that this cylinder swings the swing disc (S) according to the direction of travel and the ground speed. During the swinging motion, the pistons (K) make an axial movement on the inclined plane of the swing disc (S) which results in the oil in the filled cylinder space being displaced and in a pressure building up against the resistance at the motor.

When the entire oil quantity in the cylinder space has been displaced, the piston (K) rotating with the rotor (R) is pushed back by the feed pressure and against the sloping inclined plane of the swing disc (S) on the low-pressure side.

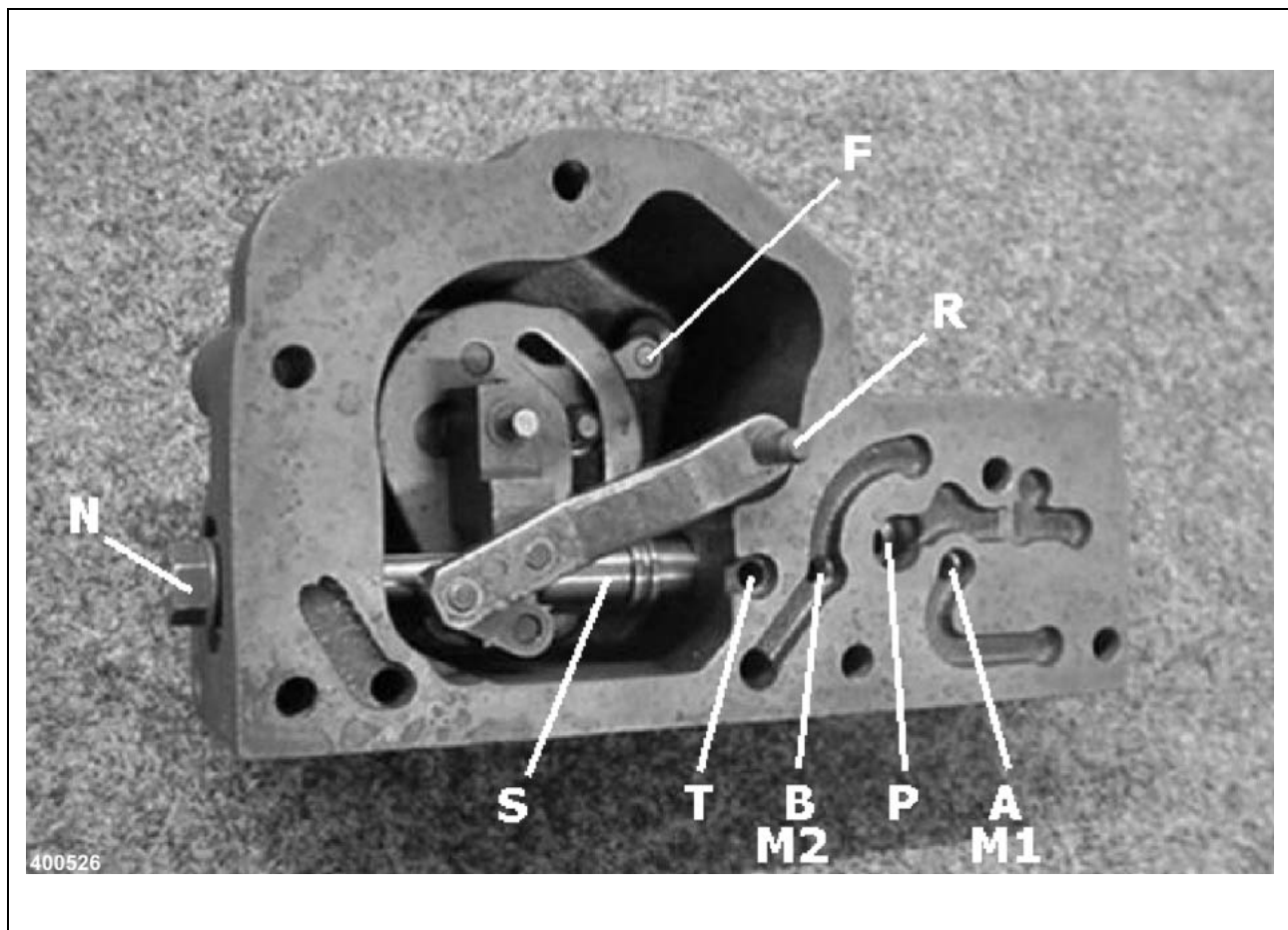
The cylinder spaces in the rotor (R) are thus filled one after the other on the sloping side of the swing disc (S) (low pressure) and then displace this oil quantity on the rising side (high pressure) against the motor unit.

According to the direction of travel, the swing disc (S) is moved to one or the other direction, making high pressure and low pressure change sides as well. The ground speed depends on the oil flow quantity and consequently on the swing angle of the swing disc (S). The swing angle pre-set on the ground speed control lever is maintained by the mechanical feedback from the swing disc (S) to the servo control valve (606).

The low-pressure side is separated from the high-pressure side inside the pump unit above the control bottom (B). For sealing purposes, the cylinder rotor (R) is pushed against the control bottom (B) only by a compression spring.

The precise return of the swing disc to the neutral position is achieved by the compression springs (F), the alignment of the mechanical neutral position being adjusted at the eccentric screws (N).

**Pump Unit**  
Servo control valve



**Key to diagram:**

A	Forward port
B	Backward port
F	Ground speed control lever rope
M1	Measuring port
M2	Measuring port
N	Stop bolt
P	Pump port
R	Feedback
S	Spool
T	Tank port

**Description of function:**

The spool (S) in the servo control valve is moved from its neutral position to one or the other direction by (F). Depending on the direction of travel, the servo cylinder is thus pressure-loaded (P) on one side (A/B) and the other side (B/A) is connected with the return line to the tank (T).

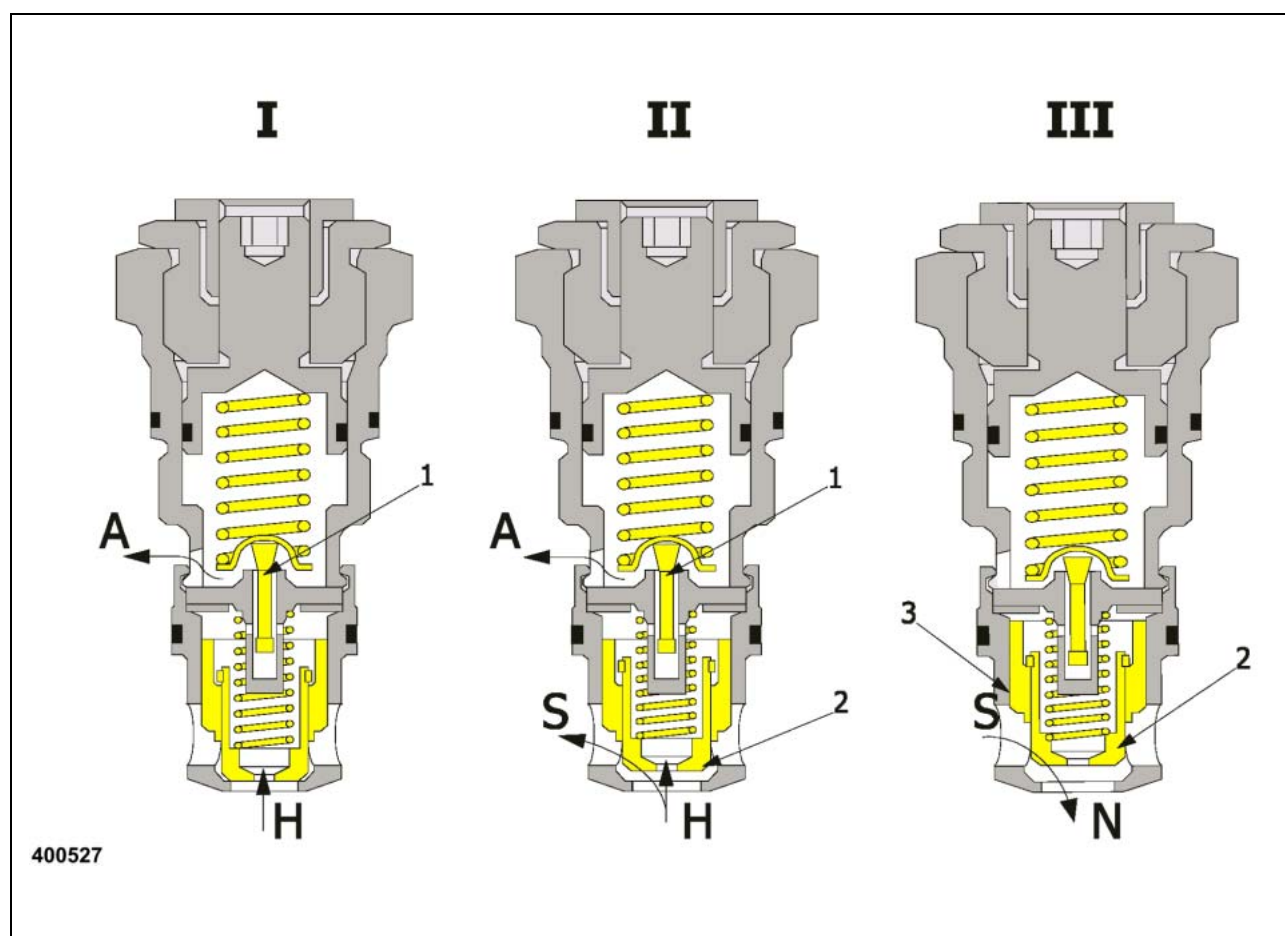
The servo cylinder swings the variable displacement pump only by the path defined by the ground speed control lever (F) because there is a mechanical feedback of the swing angle to the servo control valve. This mechanical feedback (R) balances the spool (S) in the servo control valve and therefore the pressure level at the control edge so that the defined swing angle is maintained.

**Adjusting the hydraulic neutral position:**

To align the mechanical neutral position of the ground speed control lever (F) with the hydraulic neutral position of the variable displacement pump, the spool (S) in the servo control valve is adjusted using the stop bolt (N).

To this end, the bolt (N) is turned in both directions until a pressure increase can be measured on the corresponding side of the servo cylinder (M1/M2). Mark the position of bolt (N) each time the pressure rises so the bolt can be arrested in the centre position.

**Pump Unit**  
Multi-function valve



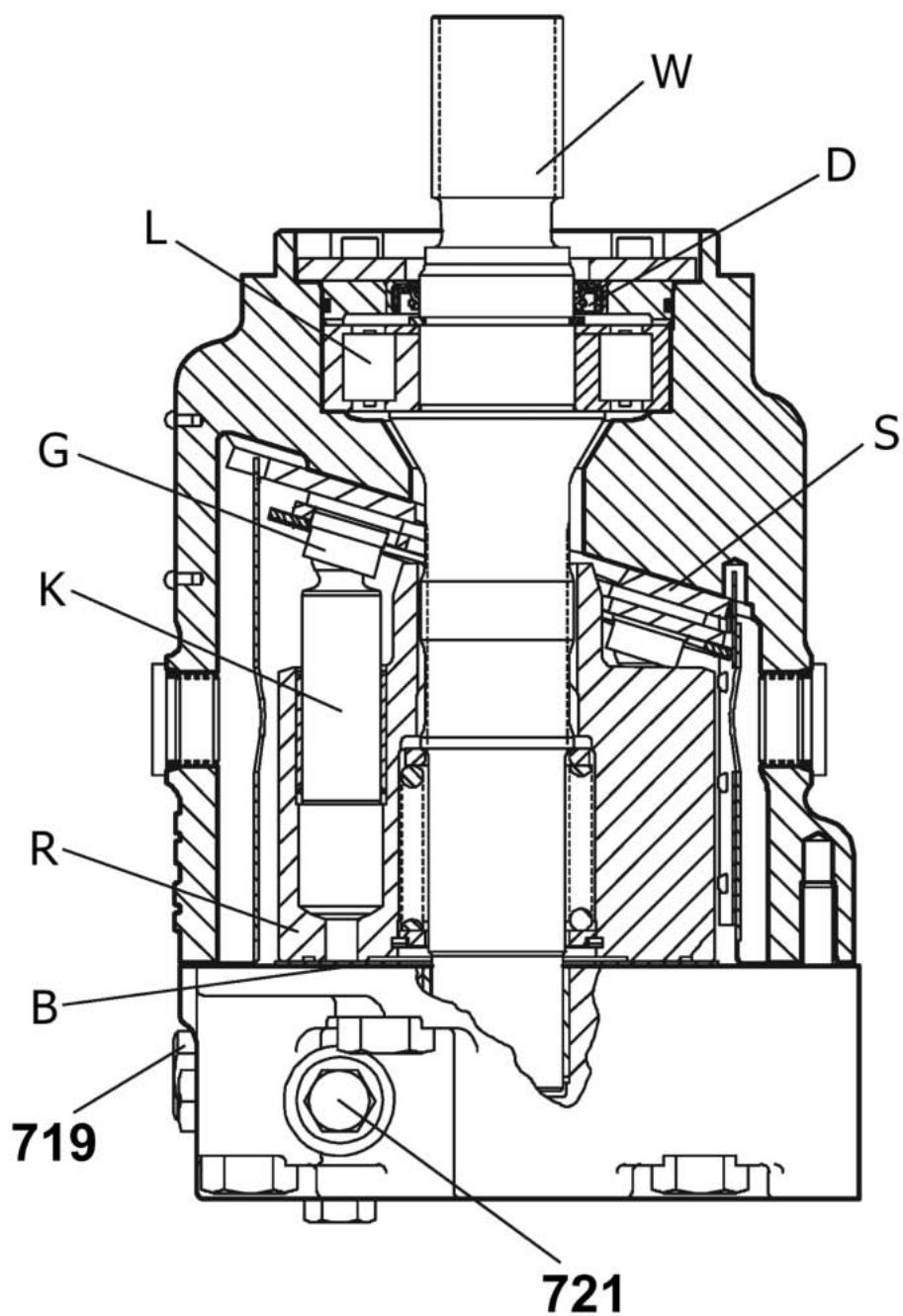
**Key to diagram:**

I	Pressure cut-off
II	High-pressure limitation
III	Feed
1	Valve cone
2	Inside valve insert
3	Outside valve insert
A	Pressure cut-off
H	High pressure
N	Low pressure
S	Feed pressure

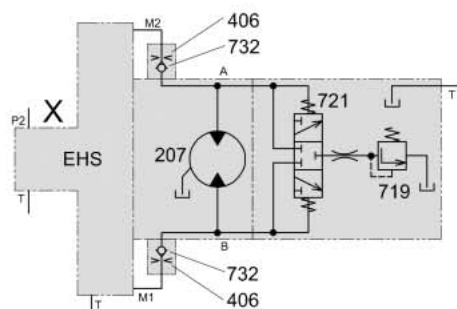
**Description of function:**

- I – Pressure cut-off: The restrictor bore in the valve cartridge makes the high pressure (H) available at the valve cone (1). If the pressure exceeds the value set at the spring, valve cone (1) opens and relieves the pressure to the pressure cut-off (A).
- II – High pressure limitation Pressure peaks in the system (H) create a ram pressure ahead of the restrictor bore in the valve cartridge opposite of the bottom spring space. This makes the inside valve insert (2) open against the spring and relieve the pressure to the feed pressure circuit (S) before the pressure cut-off (A) responds via the valve cone (1).
- III – Feed: As soon as there is no more high pressure (N) applied against the valve cartridge, the feed pressure (S) pushes the outside valve insert (3) to the top. In this process, the latter pulls the inside valve insert (2) along against the spring and thus opens the feed pressure circuit (S) to the low-pressure side (N).

### 8.1.4 Motor Unit Series 90



400528



400535

lex04-h-48a



**Key to diagram:**

721	Shuttle valve
719	Flush valve
B	Control bottom
D	Shaft seal
G	Slide
K	Piston
L	Bearing
R	Cylinder rotor
S	Fixed inclined disc
W	Drive shaft

**Description of function:**

(see also 8.1.1)

As soon as the diesel engine is started, the feed pump in the pump unit is also driven. In this process, the pistons (K) in the cylinder rotor (R) of the motor unit are pressed against the fixed inclined disc (S) by means of the slides (G) due to the feed pressure applied on both sides of the high-pressure circuit.

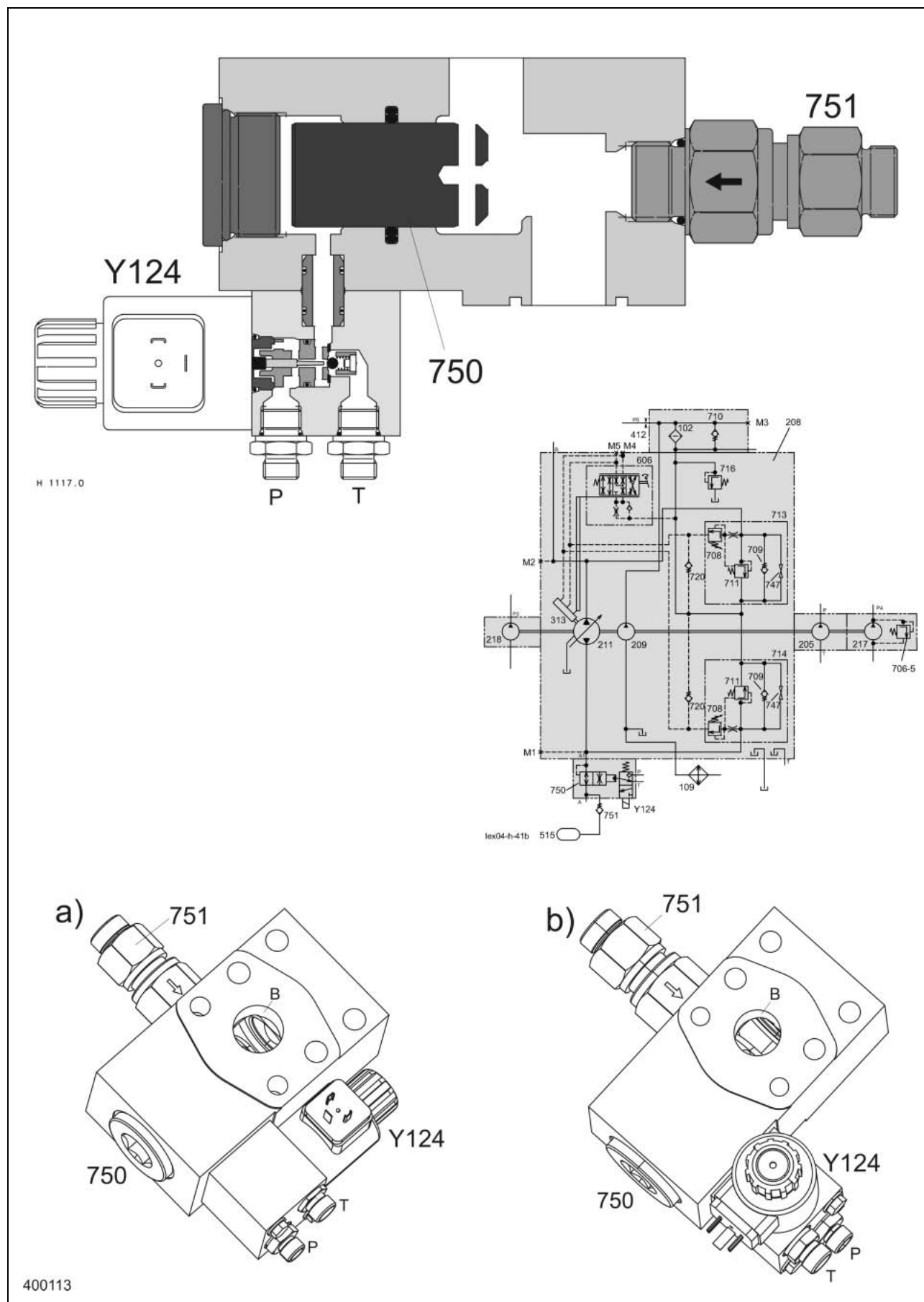
As soon as the variable displacement pump is swung out, the pressure builds up against the nine pistons (K) in the cylinder rotor (R) which is geared to the drive shaft (W), one after the other. Here the pistons (K) support themselves against the inclined plane of the fixed inclined disc (S) and thus convert this energy into a rotating motion against the resistance at the drive shaft (W).

The direction of rotation here depends on the direction of the oil flow and thus on the swing direction of the variable displacement pump, with high pressure and low pressure changing the sides. The motor speed results from the oil flow quantity therefore from the swing angle of the variable displacement pump.

The low-pressure side is separated from the high-pressure side inside the motor unit above the control bottom (B). For sealing purposes, the cylinder rotor (R) is pushed against the control bottom (B) only by a compression spring.

The respective high-pressure side in the high-pressure circuit actuates the shuttle valve (721) in the fixed displacement motor so the corresponding low-pressure side has a connection to the motor housing via the flush pressure control valve (719). Since the pressure setting of the flush pressure control valve (719) is lower than that of the feed pressure relief valve, a constant oil quantity is exchanged by the feed pump via the restrictor in the flush pressure control valve (719).

**8.1.5 Ground Drive Hydraulic Motor Brake Restrictor (HBM) Control -**  
**up to serial no. 58600336,58500162,58400895,58300298,58200051,58100037,58000028**  
 3/2 way solenoid valve



**Key to diagram:**

- 751 External feed valve (non-return valve)
- Y124 Ground drive hydraulic motor brake restrictor (HBM)

**Description of function:**

Ground drive hydraulic motor brake restrictor (Y124)

The ground drive hydraulic motor brake restrictor solenoid valve (Y124) is mounted to the ground drive pump (208).

It avoids pump damage caused by diesel engine overspeed.

When travelling downhill, the ground drive variable displacement motor (207) delivers an increased volume flow to the ground drive variable displacement pump (211). This makes the speeds of the ground drive variable displacement pump (211) and of the diesel engine rise.

At a diesel engine speed of > 2300 rpm, the ground drive hydraulic motor brake restrictor solenoid valve (Y124) is energized, the valve actuates and the working hydraulics pressure moves the piston K to the right. The restricting effect produced by this creates a ram pressure of approx. 180 bar ahead of the restrictor.

With this ram pressure and a pressure of approx. 450 bar on the opposite pump side, the pressure difference at the ground drive variable displacement pump (211) is reduced. This reduces the torque load of the diesel engine and its speed.

At a diesel engine speed of < 2200 rpm, the ground drive hydraulic motor brake restrictor solenoid valve (Y124) is deenergized, the restricting effect by piston K is cancelled.

**Note:** As early as at an allowed threshold value of 2230 rpm (e.g. downhill travel), the ground drive hydraulic motor (HBM) brake restrictor module A45 receives this information from the fieldwork computer module (A10) via the CAN bus. Now the ground drive hydraulic motor (HBM) brake restrictor module A45 actuates the master valve (Y77) in order to put a greater load on the drive (see also Electric System - Diagram 4).



**Key to diagram::****Description of function:**

Integrated brake function  
(750)

The integrated brake function provided by brake restrictor valve (750) avoids excess speed of the hydrostatic gearbox and of the diesel engine when travelling downhill. The restrictor valve is only pressure-controlled and thus does not require any external control input. The setting of the pressure control valve integrated into the restrictor valve is adapted to the diesel engine used!

When the low-pressure side becomes the high-pressure side during forward downhill travel, the integrated pressure control valve opens and relieves the spring space in the brake restrictor valve (750). In the restricted position of the brake restrictor valve (750), the hydraulic motor (207) supports itself on the restrictor and on the high-pressure valve (711). Here the pressure on the pump side downstream of the restrictor is kept constant at the value of the pressure control valve and thus adapted to the support load of the diesel engine.



## 8.2

### Hydrostatic Ground Drive - Electronic Control (EFA)

8.2.1	Circuit diagram of hydrostatic ground drive - Electronic control (EFA) .....	8-28
	Wheeled machine .....	8-28
8.2.2	Circuit diagram of hydrostatic ground drive - Electronic control (EFA) .....	8-32
	Machine equipped with half-tracks .....	8-32





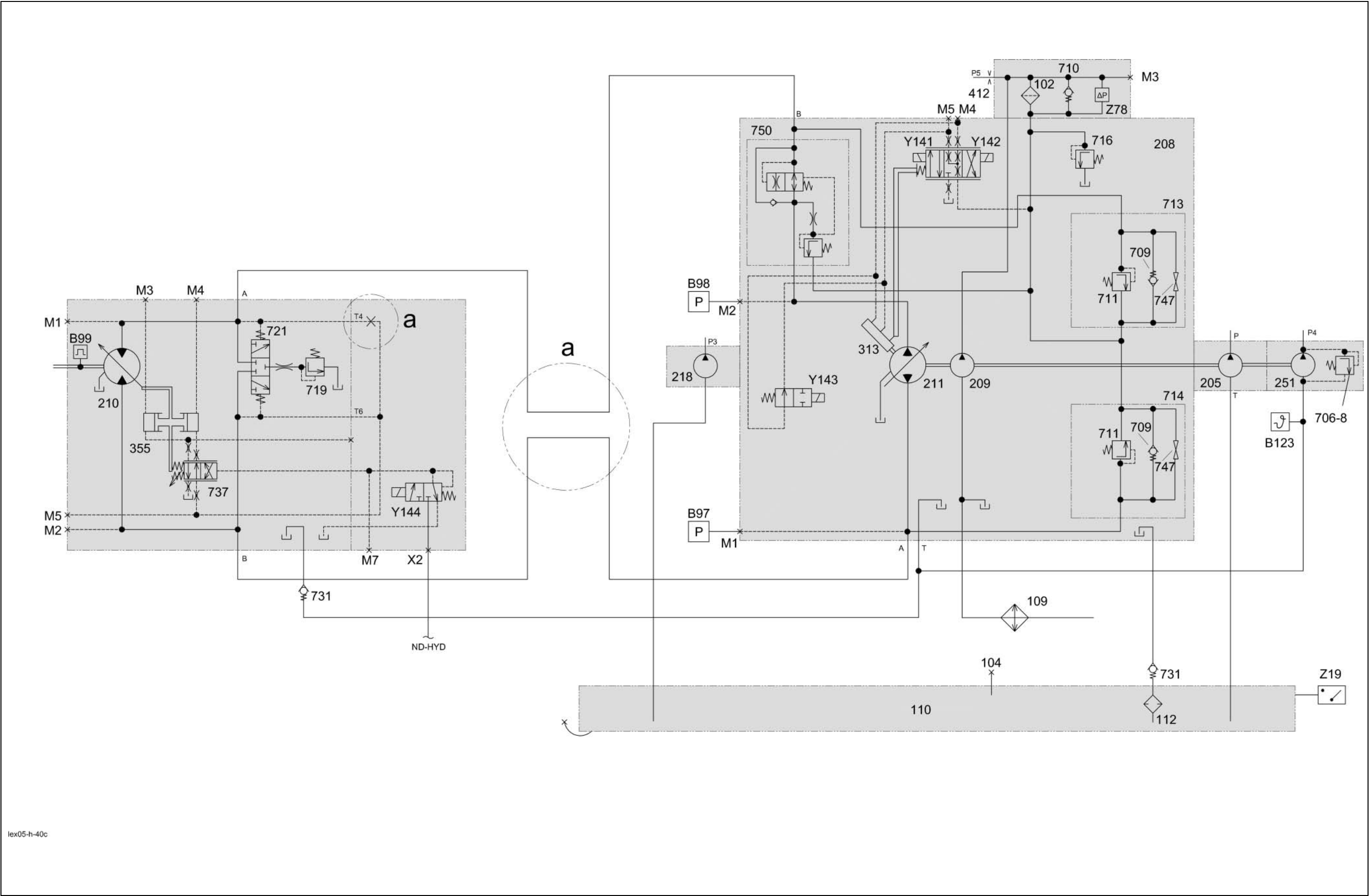
### **8.2.1**

#### **Hydrostatic Ground Drive Circuit Diagram**

Electronic control (EFA)

Wheeled machine

8.2.1 Circuit diagram of hydrostatic ground drive - Electronic control (EFA)  
Wheeled machine



lex05-h-40c

**Key to diagram:**

102	Pressure filter
104	Vent opening
109	Hydraulic system oil cooler
110	Oil tank
112	Return filter
205	Working hydraulics pump
208	Ground drive pump
209	Ground drive feed pump
210	Ground drive variable-displacement motor
211	Ground drive variable-displacement pump
218	Steering hydraulics pump
251	Pump cooling air cleaner
313	Ground drive pump servo control hydraulic cylinder
355	Ground drive motor servo control hydraulic cylinder
412	Orifice plate M Ø 2.0mm
706-8	Pressure relief valve 150 bar
709	Ground drive feed valve
710	Ground drive filter bypass valve
711	Ground drive high-pressure relief valve
713	Ground drive multi-function valve, reverse
714	Ground drive multi-function valve, forward
716	Ground drive feed pressure relief valve
719	Ground drive flush pressure control valve
721	Ground drive flush-out shuttle valve
731	Return line valve (non-return valve)
737	Ground drive motor max. - min. valve
747	Ground drive short-circuit valve
750	Brake restrictor valve
a	Wheeled machine version
B97	Ground drive hydraulics forward high-pressure sensor
B98	Ground drive hydraulics reverse high-pressure sensor
B99	Hydraulic motor speed
B123	Hydraulic oil temperature sensor
Y141	Ground drive forward solenoid coil
Y142	Ground drive reverse solenoid coil
Y143	Ground drive/cut off valve solenoid coil
Y144	Ground drive variable-displacement motor solenoid coil
Z19	Hydraulic oil level switch (min.)
Z78	Ground drive filter switch



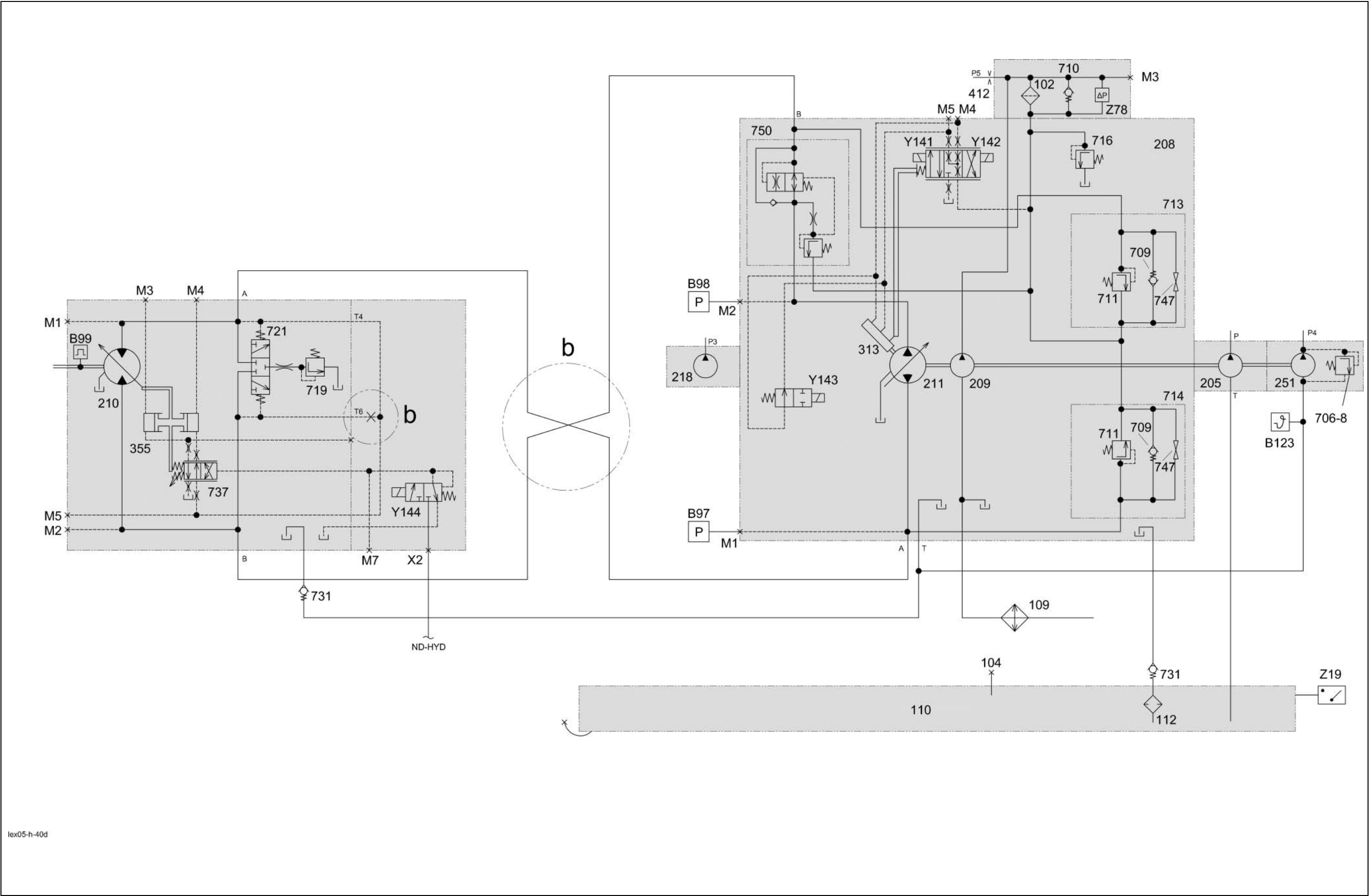
### **8.2.2**

#### **Hydrostatic Ground Drive Circuit Diagram**

Electronic control (EFA)

Machine equipped with half-tracks

8.2.2 Circuit diagram of hydrostatic ground drive - Electronic control (EFA)  
Machine equipped with half-tracks



**Key to diagram:**

102	Pressure filter
104	Vent opening
109	Hydraulic system oil cooler
110	Oil tank
112	Return filter
205	Working hydraulics pump
208	Ground drive pump
209	Ground drive feed pump
210	Ground drive variable-displacement motor
211	Ground drive variable-displacement pump
218	Steering hydraulics pump
251	Pump cooling air cleaner
313	Ground drive pump servo control hydraulic cylinder
355	Ground drive motor servo control hydraulic cylinder
412	Orifice plate M Ø 2.0mm
706-8	Pressure relief valve 150 bar
709	Ground drive feed valve
710	Ground drive filter bypass valve
711	Ground drive high-pressure relief valve
713	Ground drive multi-function valve, reverse
714	Ground drive multi-function valve, forward
716	Ground drive feed pressure relief valve
719	Ground drive flush pressure control valve
721	Ground drive flush-out shuttle valve
731	Return line valve (non-return valve)
737	Ground drive motor max. - min. valve
747	Ground drive short-circuit valve
750	Brake restrictor valve
b	Half-tracks machine version
B97	Ground drive hydraulics forward high-pressure sensor
B98	Ground drive hydraulics reverse high-pressure sensor
B99	Hydraulic motor speed
B123	Hydraulic oil temperature sensor
Y141	Ground drive forward solenoid coil
Y142	Ground drive reverse solenoid coil
Y143	Ground drive/cut off valve solenoid coil
Y144	Ground drive variable-displacement motor solenoid coil
Z19	Hydraulic oil level switch (min.)
Z78	Ground drive filter switch

**Description of function:** 1/3

Version a - Wheeled machine	With version a) (wheeled machine), the high-pressure lines are connected as shown. Position T4 designates the internal plug in the ground drive variable-displacement motor (210). This ensures that the displacement oil pressure of the ground drive variable-displacement motor (210) is taken from the high-pressure side of the hydrostatic circuit when driving forward.
Version b - Machine with half-tracks	With version b) (machine equipped with half-tracks), the high-pressure lines are connected as shown. Position T6 designates the internal plug in the ground drive variable-displacement motor (210). This ensures that the displacement oil pressure of the ground drive variable-displacement motor (210) is taken from the high-pressure side of the hydrostatic circuit when driving forward.
Oil supply	After starting the diesel engine, the steering hydraulics pump and the feed pump (209) are driven. A part of the oil quantity required on the suction side of feed pump (209) is thus fed in via the return line of steering (R) and the oil cooler (109). The feed pump (209) pumps the remaining quantity from the flush return line via the body of variable-displacement pump (211) or from the tank (110).
Feed pressure circuit	<p>The feed pressure builds up from the oil quantity of feed pump (209) pumped through the filter (102) against the feed pressure relief valve (716). Depending on the spring setting in valve (716), the oil flow is pressurised and then relieved to the tank.</p> <p>The feed pressure is applied to the servo control valve (Y141, Y142) and to the multifunction valves (713/714). When the variable-displacement pump (211) is not swung out, the feed pressure propagates to both sides of the high-pressure circuit via the feed valves in the multifunction valves (713/714).</p>
Pump servo control	<p>The spool in the servo control valve is proportionally moved from the neutral position to one or the other direction by means of solenoid coils (Y141, Y142). Depending on the direction of travel, the servo cylinder (313) is thus pressure-loaded on one side and the other side is connected with the return line to the tank.</p> <p>The servo cylinder (313) swivels the variable-displacement pump (211). Here the magnetic force of the solenoid coils (Y141 / Y142) acts against the spring force of the spool. The swivel angle is fed back mechanically to the servo control valve. This mechanical feedback balances the spool in the servo control valve and consequently the pressure level at the control edge. The pre-set swivel angle is maintained.</p>
Motor servo control	A control pressure to the ground drive motor max. - min. valve (737) is built up proportionally via solenoid coil (Y144). This pressure controls the ground drive variable-displacement motor (210). This control is according to the electronic drive control program.



**Description of function:** 2/3**High-pressure circuit**

As soon as the variable-displacement pump (211) is swung out, an axial motion is added to the radial motion of the pump unit. This axial movement displaces the oil in the cylinder space of the rotor. The oil thus acts upon the motor unit (210) which converts this energy into a rotational movement by supporting itself against the fixed inclined disc.

The respective suction side of the variable-displacement pump (211) is pressurised via the feed pressure circuit and the corresponding feed valve in the multifunction valves (713/714). This ensures that the ground drive variable-displacement pump (211) is sufficiently filled and that any occurring leaks are compensated.

Since feed pressure is always available on the suction side of the variable-displacement pump (211) as well as on the return side of the ground drive variable-displacement motor (210), this area is referred to as low-pressure side within the high-pressure circuit.

**Maximum pressure control**

When the maximum allowed high pressure value is reached, downstroking of the variable-displacement pump is performed electronically. The forward and reverse oil pressure is measured by the sensors (B97, B98) and transmitted to the ground drive module A49. As soon as the variable-displacement pump (211) swings slightly back as a result, the forward or reverse oil pressure is reduced and thus the swing angle balances at the max. pressure value.

This maximum pressure control avoids having to relieve the oil flow via a valve during the pressure relief which would heat up the oil excessively.

**High-pressure limitation**

The pressure peaks in the system which cannot be removed by the maximum pressure control are relieved to the feed pressure circuit via the high-pressure limiting valve in the multifunction valves (713/714). The high-pressure limiting is set higher than the maximum pressure control and cannot be tested.

**Flushing device**

The respective high-pressure side in the high-pressure circuit actuates the shuttle valve (721) in the fixed-displacement motor (207) so the corresponding low-pressure side has a connection to the motor housing via the flush pressure control valve (719). Since the pressure setting of the flush pressure control valve (719) is lower than that of the feed pressure relief valve (716), a constant oil quantity is exchanged by the feed pump (209) via the restrictor in the flush pressure control valve (719).

**Description of function:** 3/3

## Flush valve

The quantity flushed out by flush pressure control valve (719) is limited to **approx. 25 to 30 l/min** at rated speed and rated pressure by a restrictor bore provided in the valve insert. System-related leaks of **approx. 2 to 3 l/min** must additionally be considered for a volume flow measurement.

Integrated brake function  
(750)

The integrated brake function provided by brake restrictor valve (750) avoids excess speed of the hydrostatic gearbox and of the diesel engine when travelling downhill. The restrictor valve is only pressure-controlled and thus does not require any external control input. The setting of the pressure control valve integrated into the restrictor valve is adapted to the diesel engine used!

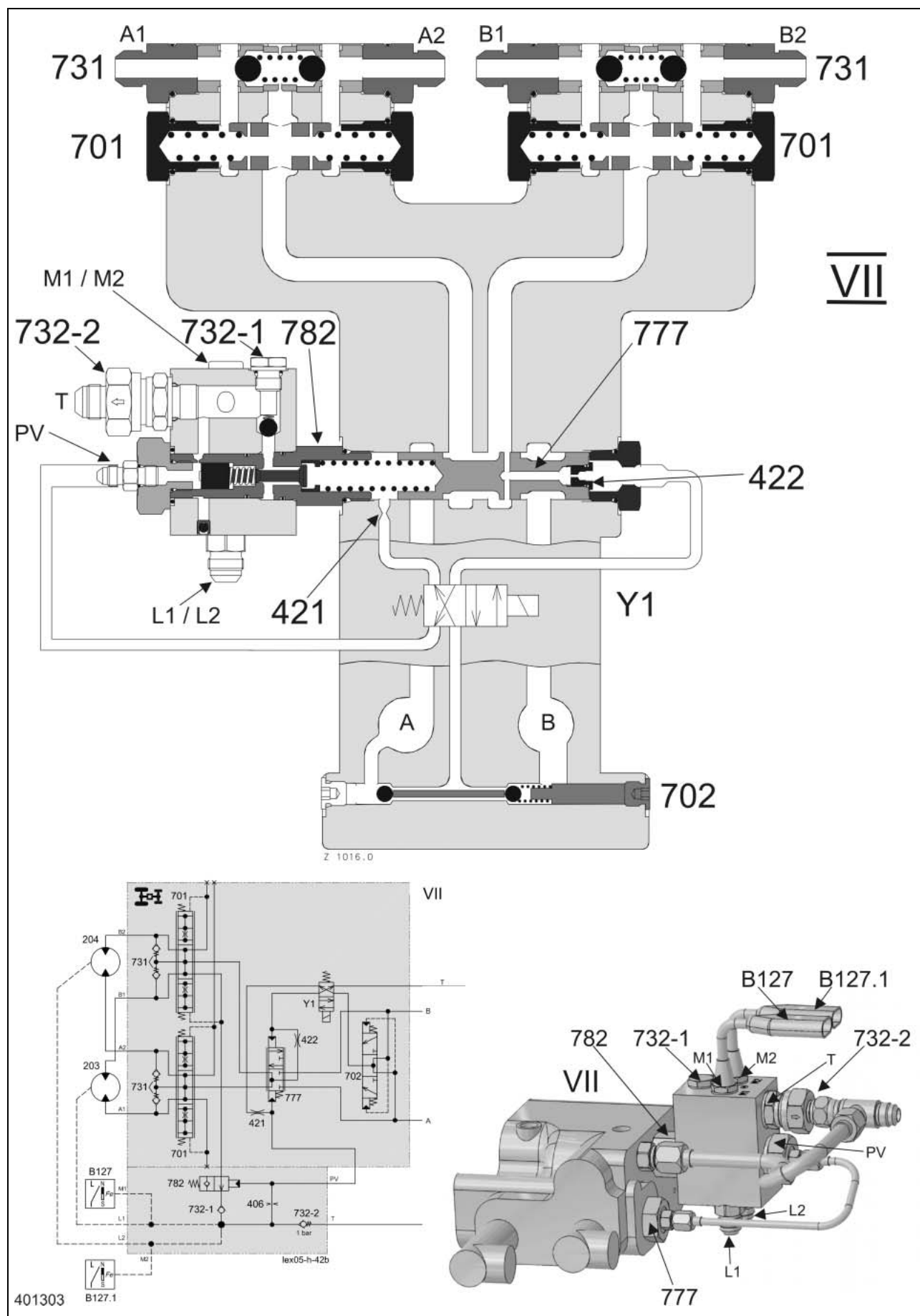
When the low-pressure side becomes the high-pressure side during forward downhill travel, the integrated pressure control valve opens and relieves the spring space in the brake restrictor valve (750). In the restricted position of the brake restrictor valve (750), the hydraulic motor (207) supports itself on the restrictor and on the high-pressure valve (711). Here the pressure on the pump side downstream of the restrictor is kept constant at the value of the pressure control valve and thus adapted to the support load of the diesel engine.

## 8.3

### 4-Trac Drive (All-wheel drive)

8.3.1	MUD HOG valve unit.....	8-38
8.3.2	POCLAIN radial piston motor.....	8-40
8.3.3	4-Trac Overdrive .....	8-42
	Valve unit for POCLAIN two-stage radial piston motor .....	8-42

## 8.3.1 MUD HOG valve unit



**Key to diagram:**

203	4 -Trac radial piston motor, left
204	4 -Trac radial piston motor, right
421	Shut-down delay restrictor
422	Switch-on delay restrictor
701	4-Trac flow control valve
702	Control oil supply shuttle valve
731	Return line valve
732-1	Non-return valve
732-2	Non-return valve (1 bar)
777	4-Trac main control valve (All-wheel drive) ON/OFF
782	4-Trac quick-action stop valve
B127	Ground drive hydraulics metal detector sensor
Y1	4-Trac (All-wheel drive) solenoid valve (pilot valve)
VII	4-Trac (All-wheel drive) valve block
A	Variable-displacement pump forward port
A1/	Right / left radial piston motor forward port
A2	
B	Variable-displacement pump reverse port
B1/2	Right / left radial piston motor reverse port
L1	Left radial piston motor leakage oil port
L2	Right radial piston motor leakage oil port
S	Feed pressure port
PV	Pressurizing pressure port
T	Tank port

**Description of function:**

The shuttle valve (702) is actuated by the respective high-pressure side in the high-pressure circuit (A/B) so that feed pressure is always available at the solenoid valve (Y1) via the corresponding low-pressure side.

Depending on the switch position of the solenoid valve (Y1), the pilot spool (777) is loaded with feed pressure either in the spring space –OFF - or on the opposite side – ON -.

The pilot spool (777) then releases the oil flow (A/B) to the radial piston motors at ports A1-A2 or B1-B2 via the corresponding flow control valve (701). The return lines from the radial piston motors B1-B2 or A1-A2 lead to the low-pressure side (B/A) via the return valve (731) located on the other level of the valve unit.

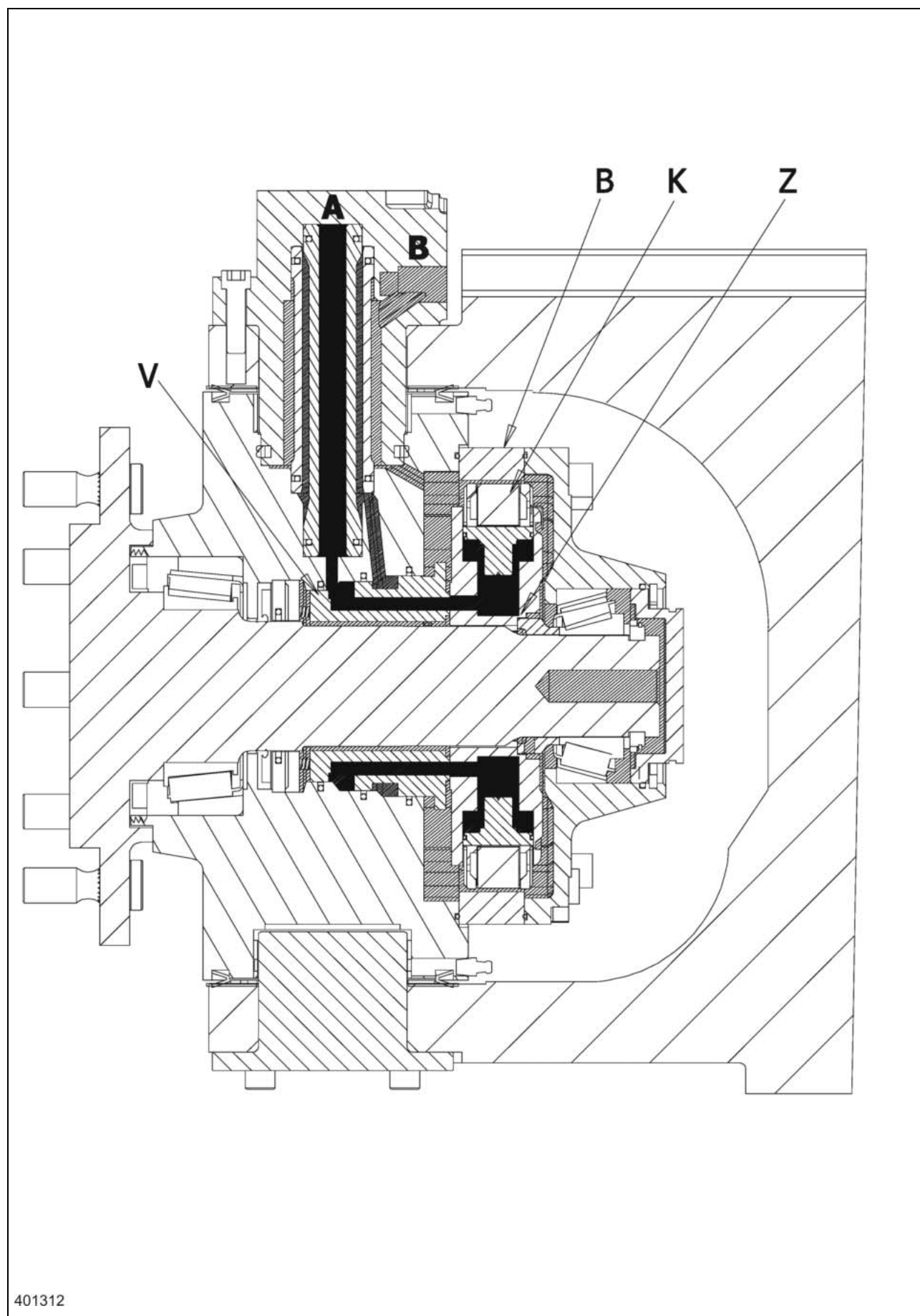
The flow control valves (701) control the differentiated oil flow to the radial piston motors in order to keep the oil from evading to the easier side of one of the two radial piston motors. In this process, the radial piston motor which is heavier loaded creates a ram pressure against the flow control spool which in turn closes the control edge on the opposite side even further and thus balances the load pressure level on both sides.

**Quick-action stop valve (782)**

When shutting down the 4-trac drive, the quick-action stop valve (782) is also energized and relieves the pressure side of the motors into the housing via the leakage oil lines.

A small oil flow through the orifice plate (406) ensures a safe rest position of the pistons in the motors since the motor housing is pressurized by the non-return valve (732-2).

## 8.3.2 POCLAIN radial piston motor



**Key to diagram:**

B	Cam track
K	Roller piston
V	Manifold block
Z	Cylinder rotor
A	High-pressure circuit port
B	High-pressure circuit port

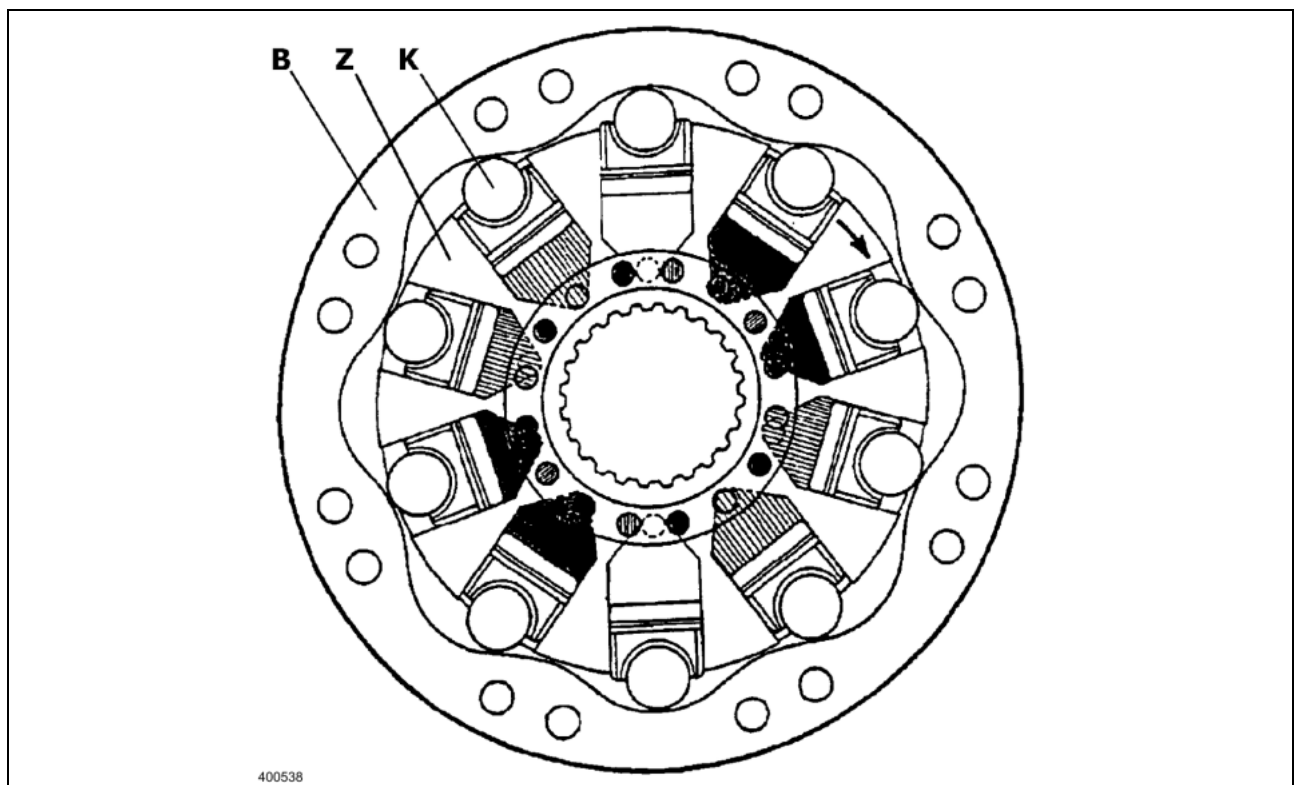
**Description of function:**

The wheel motor is designed as a radial piston motor and does not need to be mechanically separated from the drive when towing. When the drive wheel exerts a force on the motor, the cam track (B) displaces the ten pistons (K) into the cylinder rotor (Z) so that the wheel hub can rotate freely.

When the all-wheel drive is activated, the motor is supplied with oil as a function of the direction of travel, i.e. either at port A or B. Here the manifold block (V) loads the pistons (K) which are standing at the downward position of the cam track (B).

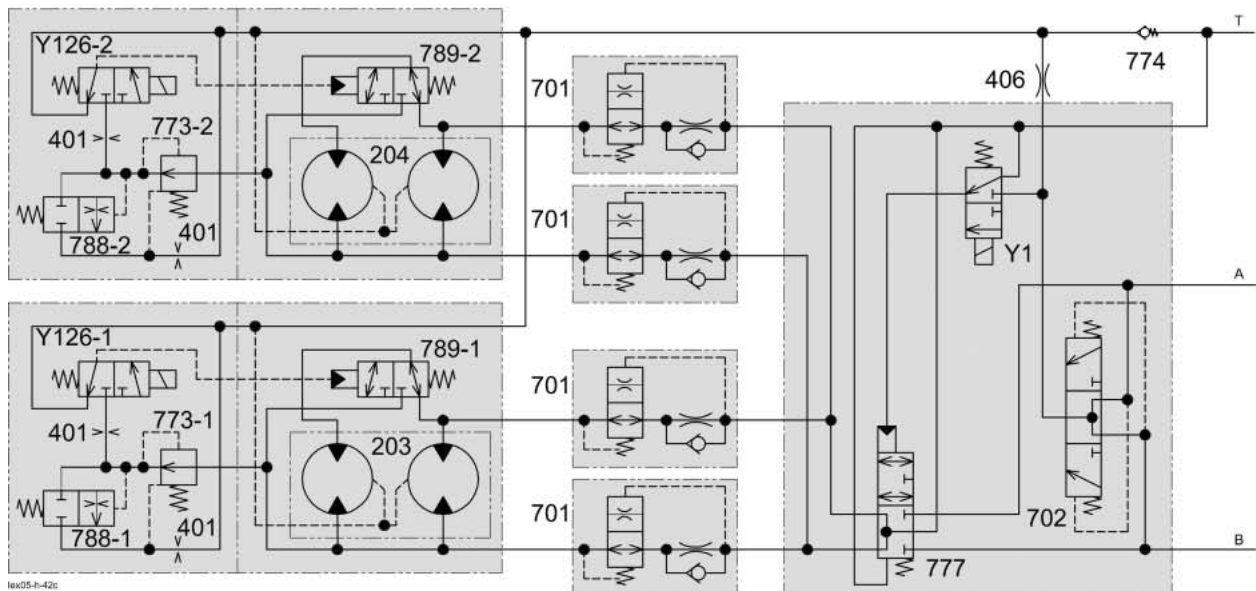
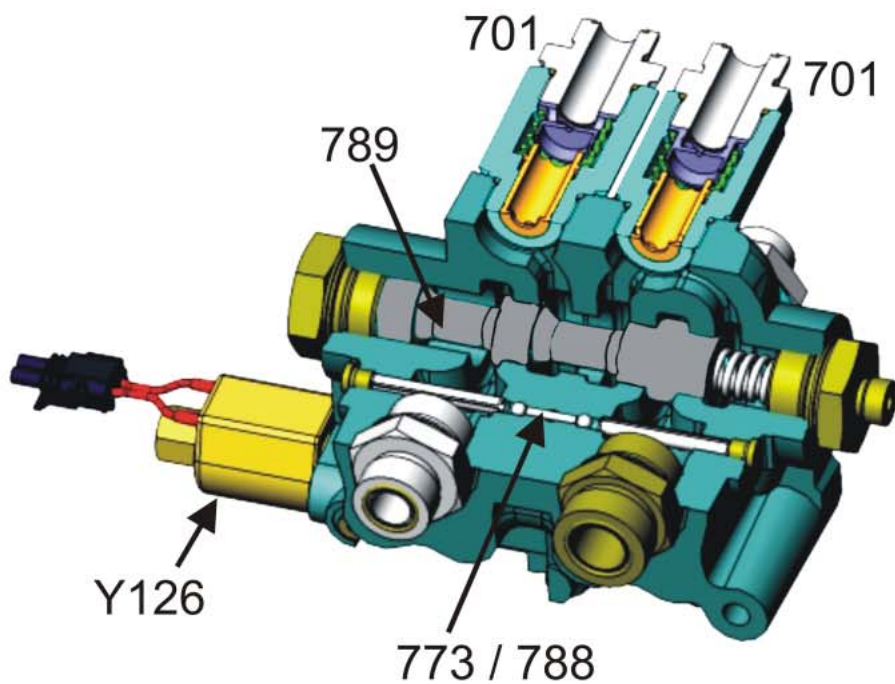
The roller on the piston (K) is now pushed away from the cam track (B) and makes the cylinder rotor (Z) rotate; this rotation is transmitted to the wheel hub by a gearwheel.

When the piston (K) moves across the rising slope in the cam track (B), the oil is displaced to the low-pressure side of the high-pressure circuit via the cylinder rotor (Z) and the manifold block (V).



**8.3.3 4-Trac Overdrive**

Valve unit for POCLAIN two-stage radial piston motor



401311



**Key to diagram:**

203	4 -Trac radial piston motor, left
204	4 -Trac radial piston motor, right
401	Orifice plate A
406	Orifice plate F Ø 0.8 mm
701	4-Trac flow control valve
773	Pressure controller
774	Pressurizing valve
777	4-Trac main control valve (All-wheel drive) ON/OFF
788	4-Trac Overdrive flush valve
789	4-Trac Overdrive connecting valve
Y1	4-Trac (All-wheel drive) solenoid valve (pilot valve)
Y126	4-Trac overdrive solenoid valve
A	Variable-displacement pump forward port
B	Variable-displacement pump reverse port
T	Tank port

**Description of function:**

The 4-trac overdrive function uses 2-stage radial piston motors.

**Overdrive OFF**

In each radial piston motor (203/204), two rotor sets are connected with one another in parallel via the connecting valve (789).  
When the input volume is doubled, the speed of the radial piston motors (203/204) is reduced while the torque that can be transmitted is increased.

**Overdrive ON**

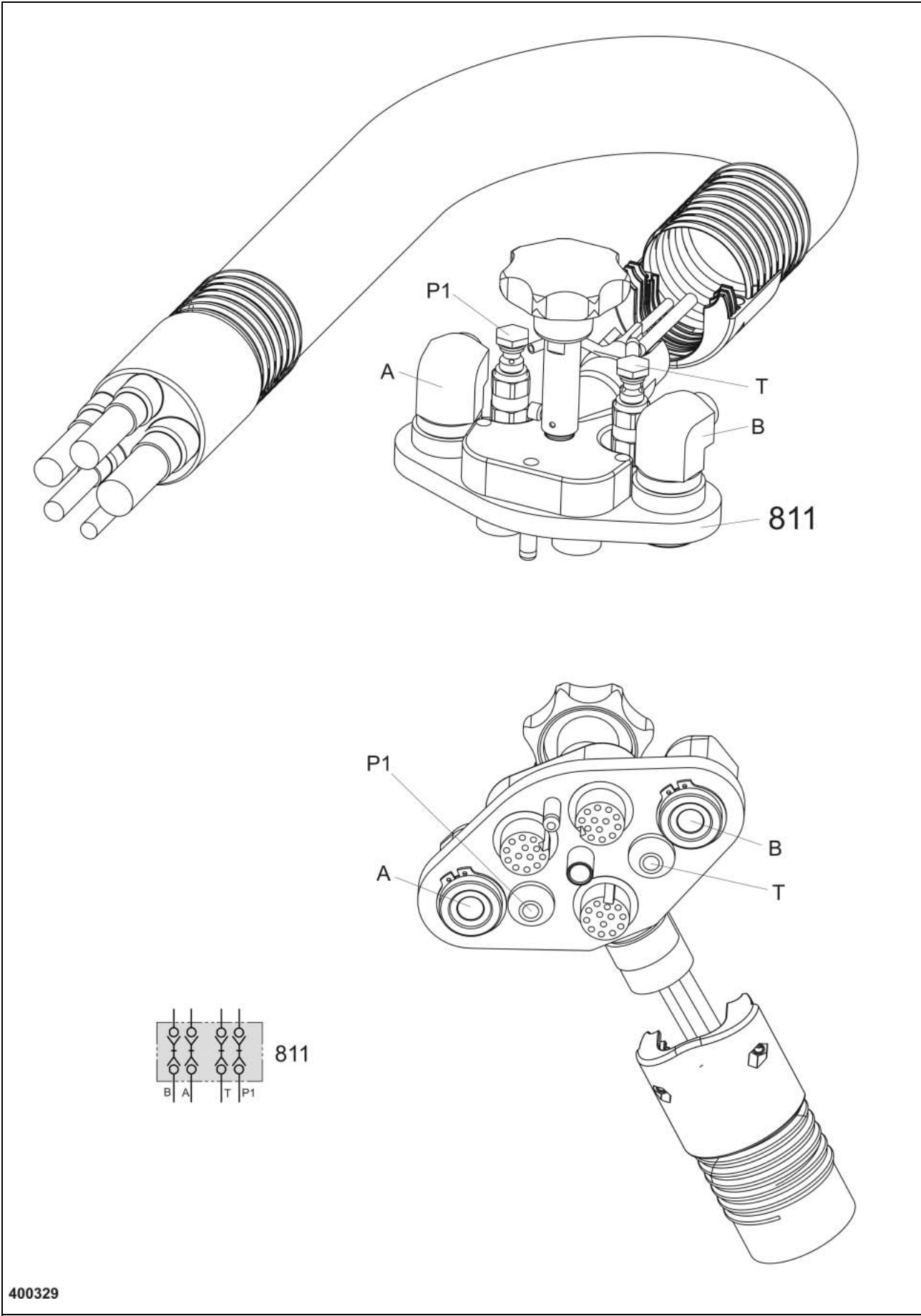
When the 4-trac overdrive solenoid valve (Y126) is energized, two rotor sets are connected with one another serially via the connecting valve (789).  
When the input volume is reduced, the torque that can be transmitted from the radial piston motors (203/204) is decreased while the speed is increased.



**10****Multi-coupling**

<b>10</b>	<b>Multi-coupling .....</b>	<b>10-2</b>
-----------	-----------------------------	-------------

10 Multi-coupling



- Key to diagram:
- |     |                                 |
|-----|---------------------------------|
| 811 | Multi-coupling                  |
| A   | Reel drive hydraulic motor port |
| B   | Reel drive hydraulic motor port |
| P1  | Pump via master valve port      |
| T   | Tank port                       |

400329

**Notes:**



## 11

### Standard Cutterbar

<b>11.1</b>	<b>Standard Cutterbar Circuit Diagram .....</b>	<b>11-4</b>
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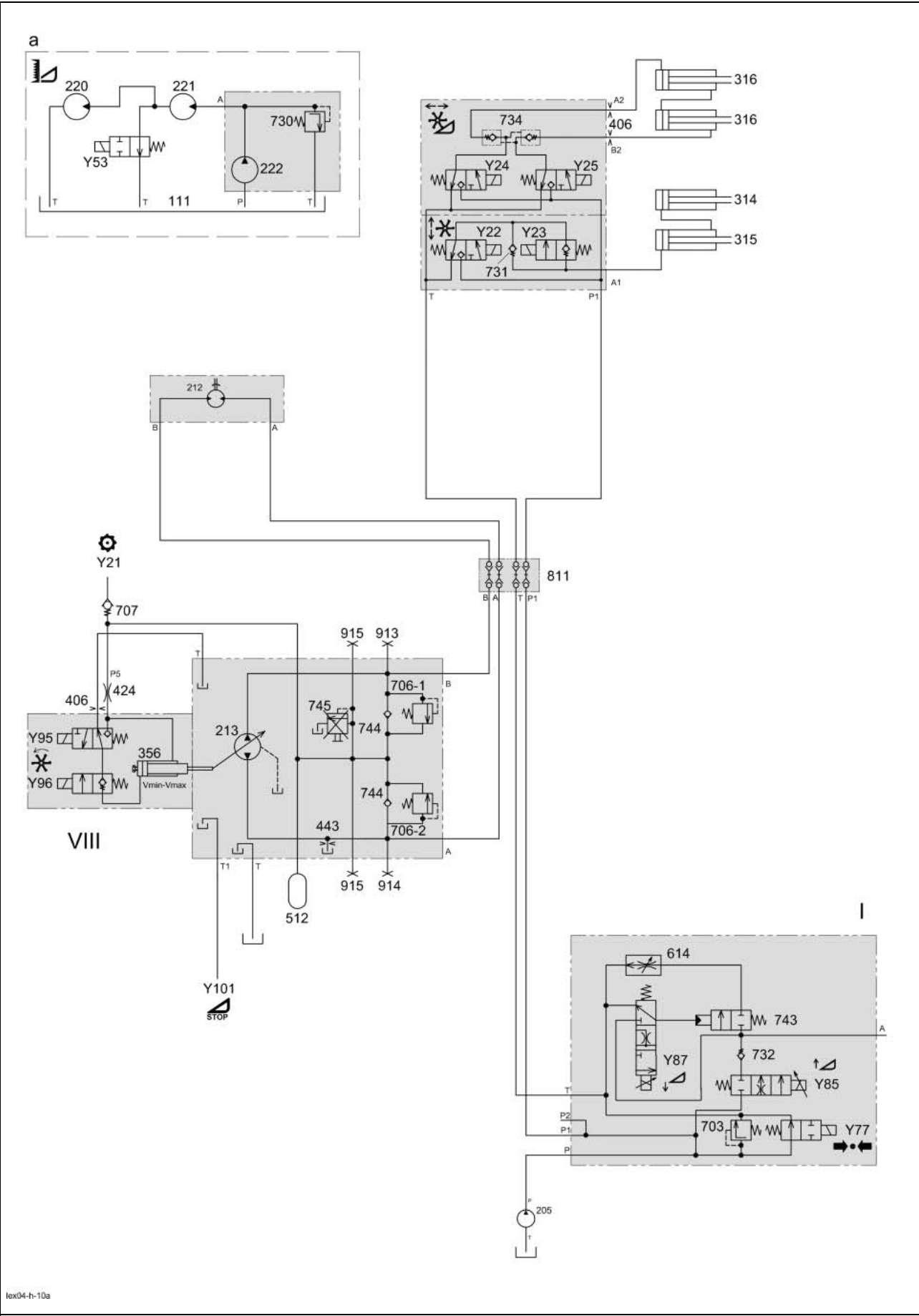




## **11.1**

### **Standard Cutterbar Circuit Diagram**

11.1 Standard Cutterbar Circuit Diagram



Key to diagram:

- |      |   |                               |
|------|---|-------------------------------|
| 111  | Auxiliary hydraulic system oil tank (rape)..... | 2.0 litres                    |
| 205  | Working hydraulics pump .....                   | 14 / 19 cm <sup>3</sup> /rev. |
| 212  | Reel drive motor .....                          | 160 cm <sup>3</sup> /rev.     |
| 213  | Reel drive pump .....                           | 15 cm <sup>3</sup> /rev.      |
| 220  | Left-hand knife drive hydraulic motor .....     | OMM20                         |
| 221  | Right-hand knife drive hydraulic motor.....     | OMM20                         |
| 222  | Hydraulic pump.....                             | 9 cm <sup>3</sup> /rev.       |
| 314  | Vertical reel adjustment slave cylinder         |                               |
| 315  | Vertical reel adjustment master cylinder        |                               |
| 316  | Horizontal reel adjustment hydraulic cylinder   |                               |
| 356  | Reel drive control hydraulic cylinder           |                               |
| 406  | Orifice plate .....                             | Ø 0.8 mm                      |
| 424  | Restrictor .....                                | Ø 0.6 mm                      |
| 443  | Reel drive rinsing restrictor.....              | Ø 0.9 mm                      |
| 512  | Reel drive accumulator                          |                               |
| 614  | Flow control valve.....                         | 5 - 50 l/min                  |
| 703  | Pressure relief valve.....                      | 180 <sup>+15</sup> bar        |
| 706* | Pressure relief valve.....                      | 159 <sup>+4</sup> bar         |
| 707  | Pressure holding valve (non-return valve)       |                               |
| 730  | Pressure relief valve.....                      | 180±5 bar                     |
| 731  | Return line valve (non-return valve)            |                               |
| 732  | Non-return valve (Inlet valve)                  |                               |
| 734  | Non-return valve (Lock-up valve unit)           |                               |
| 743  | Lower front attachment pilot valve              |                               |
| 744  | Reel drive feed valve                           |                               |
| 745  | Reel drive feed pressure relief valve.....      | (blocked)                     |
| 811  | Multi-coupling                                  |                               |
| 913  | Reel drive high pressure forward measuring port |                               |
| 914  | Reel drive high pressure reverse measuring port |                               |
| 915  | Reel drive feed pressure measuring port         |                               |
| Y21  | Threshing mechanism solenoid valve              |                               |
| Y22  | Reel raise solenoid valve                       |                               |
| Y23  | Reel lower solenoid valve                       |                               |
| Y24  | Reel forward solenoid valve                     |                               |
| Y25  | Reel reverse solenoid valve                     |                               |
| Y53  | Left rape knife circuit solenoid valve          |                               |
| Y77  | Master valve solenoid valve                     |                               |
| Y85  | Raise front attachment solenoid valve           |                               |
| Y87  | Lower front attachment solenoid valve           |                               |
| Y95  | Reel rpm fast solenoid valve                    |                               |
| Y96  | Reel rpm slow solenoid valve                    |                               |
| Y101 | Front attachment quick stop solenoid coil       |                               |

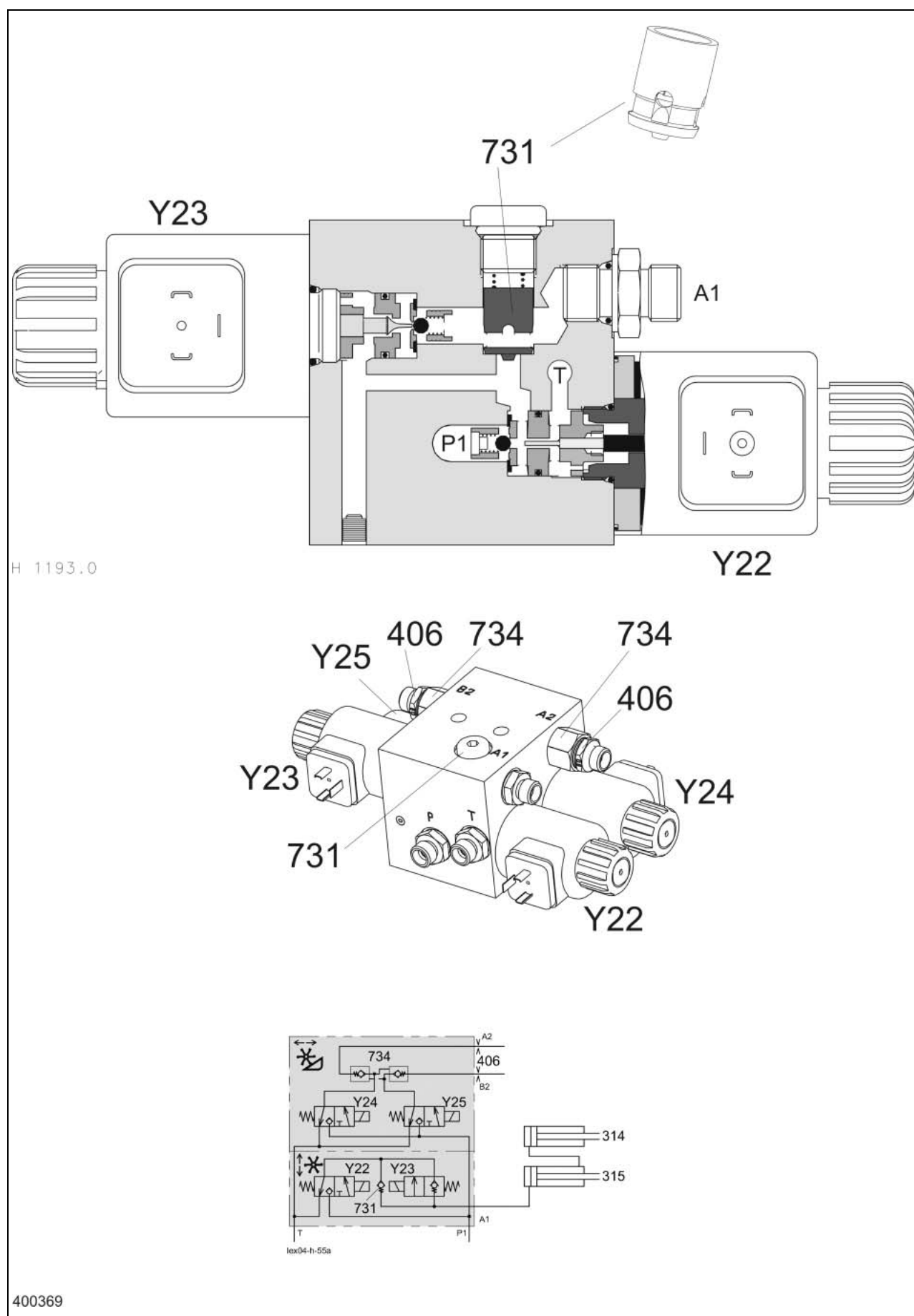
\* The measurable pressure at the pressure relief valves (703) of the reel drive pump consists of the static setting of the valves (140 bar) and the low pressure (19<sup>+4</sup> bar)!

**Key to diagram:**

I	Main valve block
VIII	Hydraulic reel drive valve block
a	Option
A1	Vertical reel adjustment hydraulic cylinder port
A2	Horizontal reel adjustment hydraulic cylinder port
B2	Horizontal reel adjustment hydraulic cylinder port
P	Working hydraulics pump port
P1	Master valve / Working hydraulics pump port
P2	Electro-hydraulic gearshift (EHS) / Working hydraulics pump port
P5	Threshing mechanism hydraulic cylinder (low pressure) port
T	Tank port

## 11.2 Vertical Reel Adjustment (Standard Cutterbar)

3/3 way valve



**Key to diagram:**

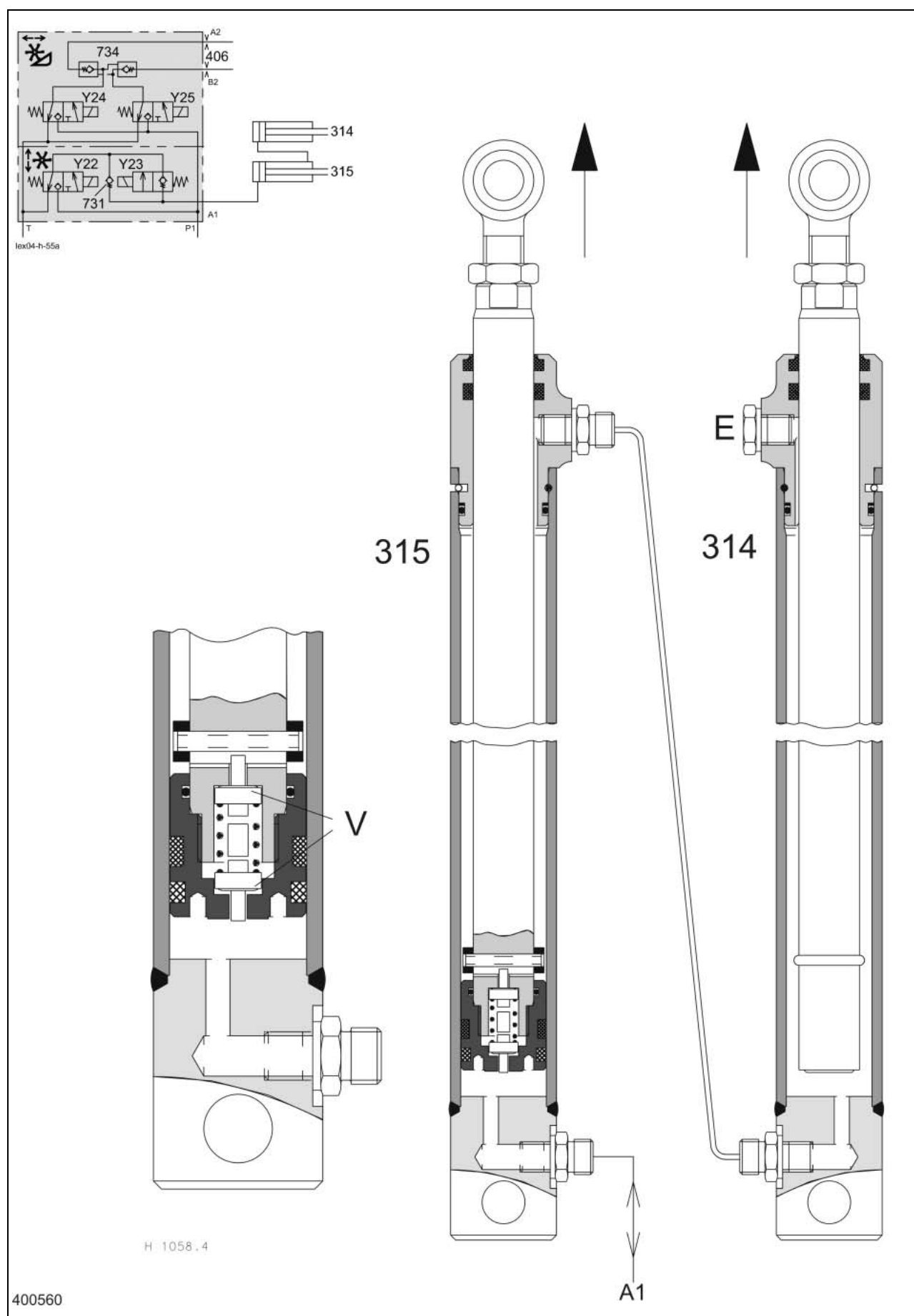
314	Reel raise/lower slave cylinder
315	Reel raise/lower master cylinder
406	Orifice plate ..... Ø 0.8 mm
731	Return line valve (non-return valve)
734	Lock-up valve unit (non-return valve)
Y22	Reel raise solenoid valve
Y23	Reel lower solenoid valve
Y24	Reel forward solenoid valve
Y25	Reel reverse solenoid valve
A1	Vertical reel adjustment hydraulic cylinder port
A2	Horizontal reel adjustment hydraulic cylinder port
B2	Horizontal reel adjustment hydraulic cylinder port
P1	Master valve / Working hydraulics pump port
T	Tank port

**Description of function:**

Neutral	The hydraulic cylinders are tightly closed by the non-return valve (731) in the valve insert of solenoid valve (Y23).
Raise reel	The solenoid valve (Y22) and the master valve (Y77) are actuated at the same time. The corresponding pilot spool opens the ball in the valve insert and closes the return line to the tank. The pressure P1 which consequently rises opens the non-return valve (731) in the valve insert of the unactuated solenoid valve (Y23) and the oil flows to the consumer port A1.
Lower reel	Solenoid valve (Y23) is actuated without the master valve (Y77). The pilot spool in question opens the ball in the valve insert and thus relieves the oil pressure to the tank via the valve insert of the unactuated solenoid valve (Y22).

**Vertical Reel Adjustment (Standard Cutterbar)**

Hydraulic cylinders



**Key to diagram:**

314	Reel raise/lower slave cylinder
315	Reel raise/lower master cylinder
406	Orifice plate ..... Ø 0.8 mm
731	Return line valve (non-return valve)
734	Lock-up valve unit (non-return valve)
Y22	Reel raise solenoid valve
Y23	Reel lower solenoid valve
Y24	Reel forward solenoid valve
Y25	Reel reverse solenoid valve
A1	Vertical reel adjustment hydraulic cylinder port
A2	Horizontal reel adjustment hydraulic cylinder port
B2	Horizontal reel adjustment hydraulic cylinder port
E	Vent plug
V	Bottom valves
P1	Master valve / Working hydraulics pump port
T	Tank port

**Description of function:****Synchronism function**

These hydraulic synchronism cylinders are designed so that the face end of the left cylinder (315) corresponds to the piston rod side of the right cylinder (314). The cylinders therefore are synchronous, making the connecting rods retract and extend in parallel, independent of their load.

**Bottom valves**

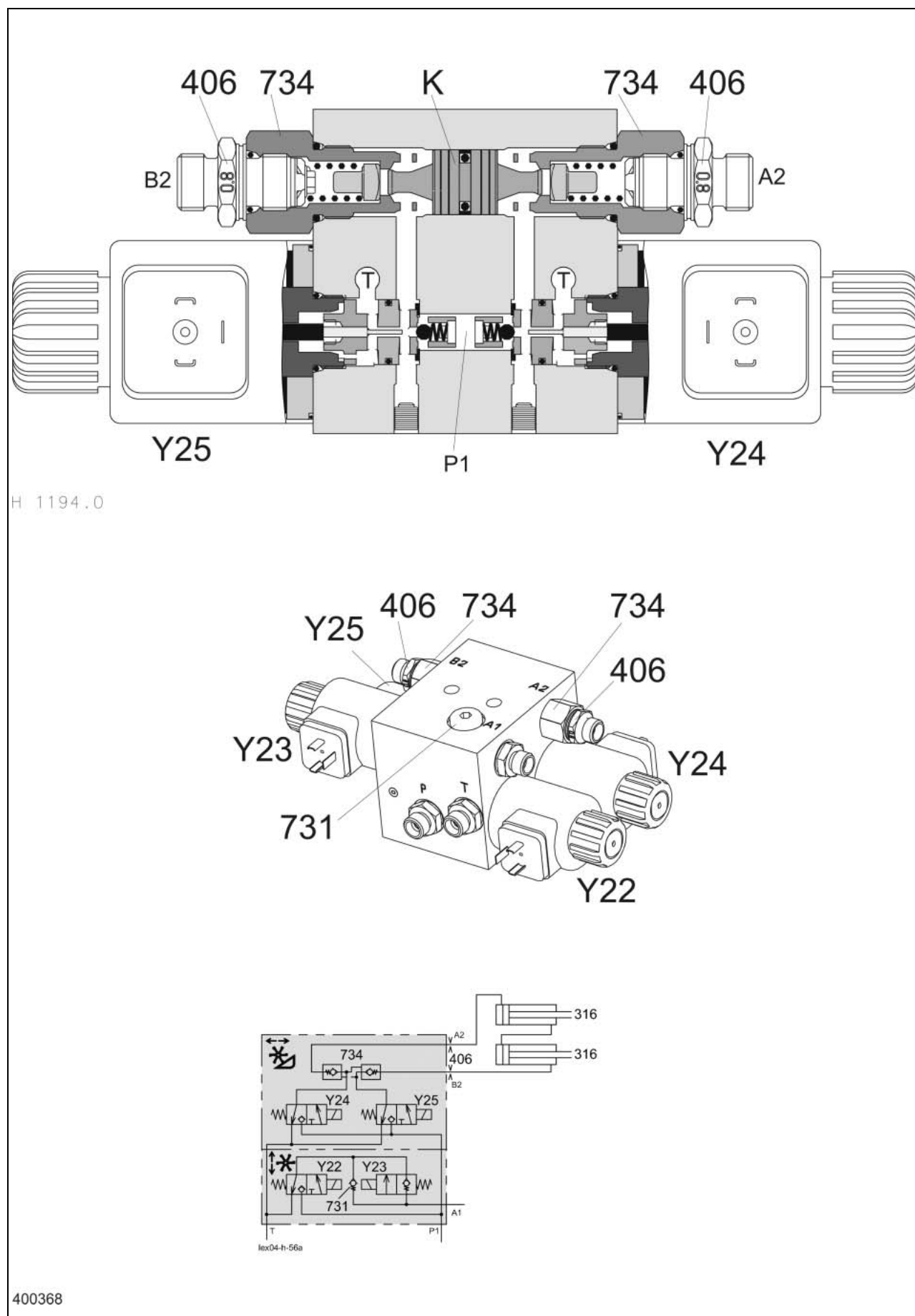
The bottom valves (V) in master cylinder (315) are opened upon reaching the upper end stop position so that the slave cylinder can be filled and vented.

**Note:**

For repairs, it is recommended to remove the hydraulic cylinders in the raised reel position since the slave cylinder is filled only with the master cylinder fully extended. During this process support and secure the reel properly.

**11.3 Horizontal Reel Adjustment (Standard Cutterbar)**

4/3 way valve with lock-up valve unit



400368



**Key to diagram:**

316	Horizontal reel adjustment hydraulic cylinder
406	Orifice plate Ø 0.8 mm
731	Return line valve (non-return valve)
734	Non-return valve (Lock-up valve unit)
Y22	Reel raise solenoid valve
Y23	Reel lower solenoid valve
Y24	Reel forward solenoid valve
Y25	Reel reverse solenoid valve
A1	Vertical reel adjustment hydraulic cylinder port
A2	Horizontal reel adjustment hydraulic cylinder port
B2	Horizontal reel adjustment hydraulic cylinder port
P1	Master valve / Working hydraulics pump port
T	Tank port
K	Piston

**Description of function:****Neutral**

Both sides of the hydraulic cylinder are tightly closed by the non-return valves (734) in the consumer ports A and B.

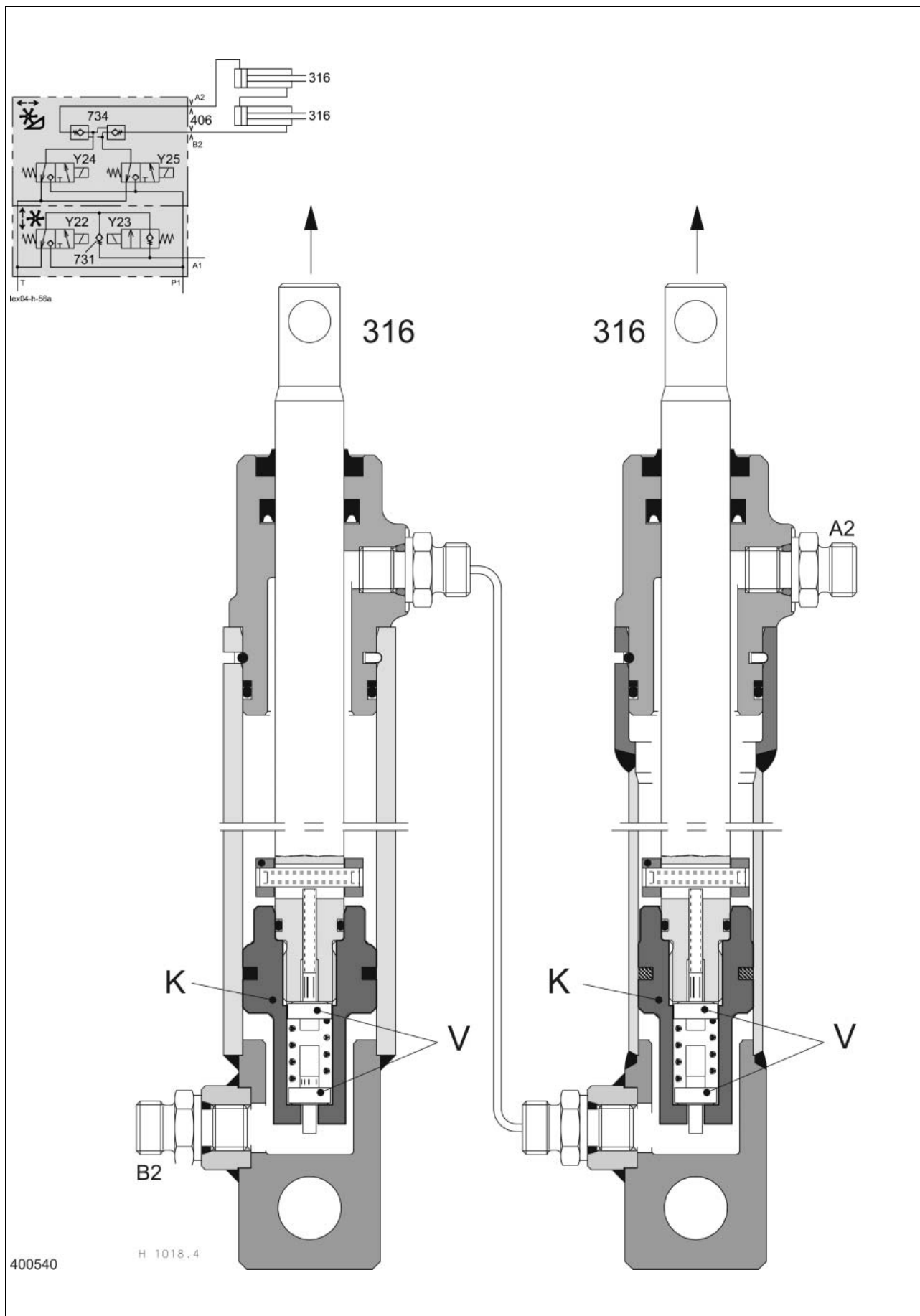
**Reel forward / reverse**

Depending on the necessary direction of movement, one of the solenoid valves (Y24/Y25) and, at the same time, the master valve (Y77) is actuated. The corresponding pilot spool opens the ball in the valve insert and closes the return line to the tank. The pressure which consequently rises builds up against piston (K) and opens the non-return valve (734) in port A2 or B2.

The return line of the hydraulic cylinder is thus released to the tank via the valve insert of the unactuated solenoid valve (Y24/Y25). The pressure rising further now opens the non-return valve (734) at the opposite port and the hydraulic cylinders are retracted or extended.

**Horizontal Reel Adjustment (Standard Cutterbar)**

Hydraulic cylinders



**Key to diagram:**

316	Horizontal reel adjustment hydraulic cylinder
406	Orifice plate Ø 0.8 mm
731	Return line valve (non-return valve)
734	Non-return valve (Lock-up valve unit)
Y22	Reel raise solenoid valve
Y23	Reel lower solenoid valve
Y24	Reel forward solenoid valve
Y25	Reel reverse solenoid valve
A1	Vertical reel adjustment hydraulic cylinder port
A2	Horizontal reel adjustment hydraulic cylinder port
B2	Horizontal reel adjustment hydraulic cylinder port
P1	Master valve / Working hydraulics pump port
T	Tank port
K	Piston
V	Bottom valves

**Description of function:**

## Synchronism function

This pair of hydraulic synchronism cylinders are designed so that the face end of the left cylinder corresponds to the piston rod side of the right cylinder. The cylinders therefore are synchronous, making the connecting rods retract and extend in parallel, independent of their load.

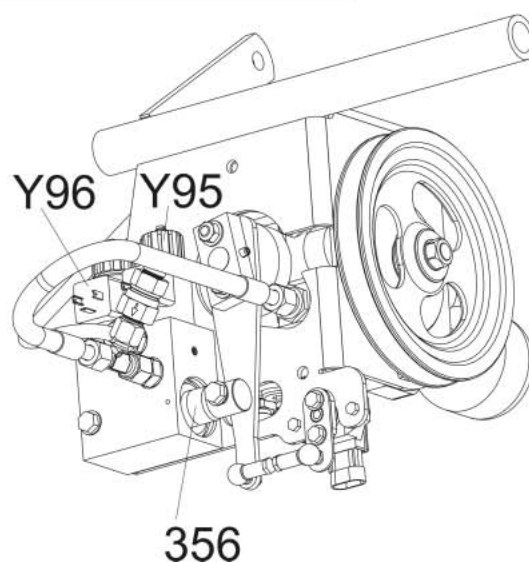
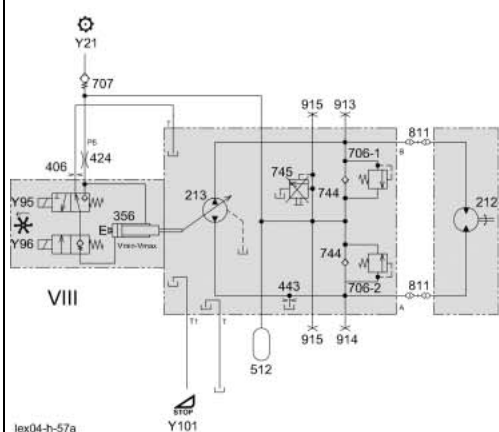
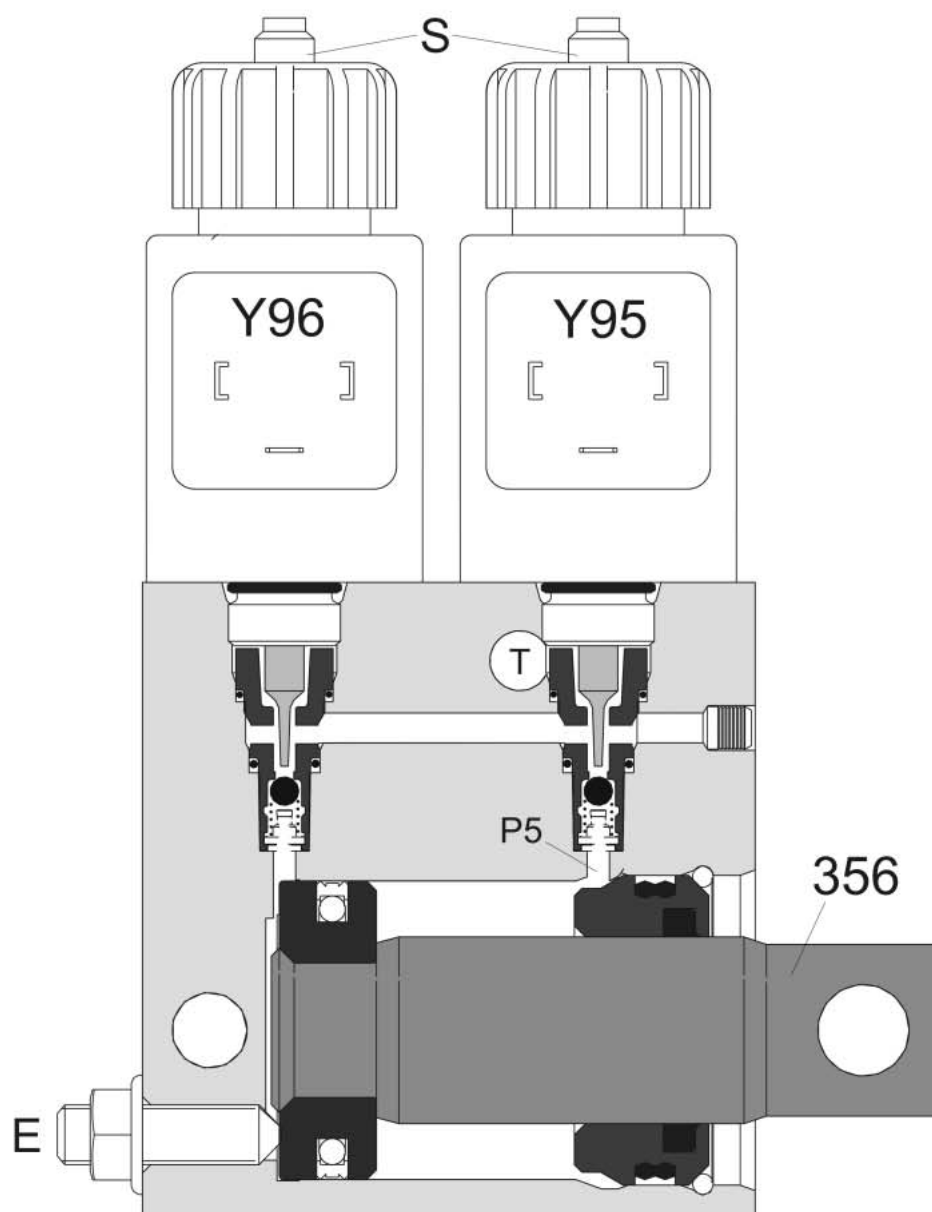
## Bottom valves

The bottom valves (V) open every time an end position is reached so that air inclusions in the connection between the two cylinders can be flushed out.

After a repair, the cylinders must be flushed in both end positions for approx. 15 sec.

#### 11.4 Reel Rpm Adjustment (Standard Cutterbar)

3/3 way valve



400544

**Key to diagram:**

212	Reel drive motor	
213	Reel drive pump .....	15 cm <sup>3</sup> /rev.
356	Reel drive control hydraulic cylinder	
406	Orifice plate .....	Ø 0.8 mm
424	Restrictor D .....	Ø 0.6 mm
426	Restrictor F .....	Ø 0.8 mm
443	Reel drive rinsing restrictor .....	Ø 0.9 mm
512	Reel drive accumulator	
706*	Pressure relief valve .....	159 <sup>+4</sup> bar
707	Pressure holding valve (non-return valve)	
744	Reel drive feed valve	
745	Reel drive feed pressure relief valve .....	(blocked)
811	Multi-coupling	
913	Reel drive high pressure forward measuring port	
914	Reel drive high pressure reverse measuring port	
915	Reel drive feed pressure measuring port	
Y21	Threshing mechanism solenoid valve	
Y95	Reel rpm fast solenoid valve	
Y96	Reel rpm slow solenoid valve	
Y101	Front attachment quick stop solenoid coil	
A	Consumer port	
B	Consumer port	
E	Reel pump adjusting screw	
K	Piston	
P5	Threshing mechanism hydraulic cylinder (low pressure) port	
S	Emergency operation screw	
T	Tank port	
VIII	Reel drive valve block	

\* The measurable pressure at the pressure relief valves (703) of the reel drive pump consists of the static setting of the valves (140 bar) and the low pressure (19<sup>+4</sup> bar)!

**Description of function:**

The hydraulic reel rpm control is realised using a variable displacement-type axial piston pump (213).

The axial piston pump (213) is adjusted only when a cutterbar or a maize picker with hydraulic down maize augers is engaged and activated. When operating without front attachment or with another front attachment, there is no axial piston pump adjustment, it remains in its basic position.

When the threshing mechanism is engaged, the system is supplied with oil by solenoid valve (Y21) (low-pressure hydraulics). The hydraulic cylinder (356) is controlled by the solenoid valves (Y95/Y96) and determines the swivel angle and therefore the volumetric delivery of pump (213). The reel module actuates the solenoid valves (Y95/Y96) in a modulated way.

After engaging the front attachment, the axial piston pump (213) is driven mechanically and delivers the required volume flow.

The sense of rotation of the pump (forward or backward) depends on the sense of rotation of the front attachment.

To protect the system against overheating, an oil quantity is permanently flushed out via restrictor (443) in the return line circuit.

The pressure relief valves (706) safeguard the system at 160 bar (abs) in the respective high-pressure circuits.

If the reel runs on when the threshing mechanism is shut off, the accumulator (512) avoids running dry of the pump and the motor.

**Note:** After shutting off the front attachment, the reel rpm slow solenoid valve (Y96) is energized for another 4 seconds in order to fully retract the ram in the reel drive control hydraulic cylinder (356) (zero delivery by pump). The accumulator (512) additionally supports this process.

**Pump setting**

## - hydraulic

The basic setting of the axial piston pump (213) must be set to zero delivery by means of screw E.

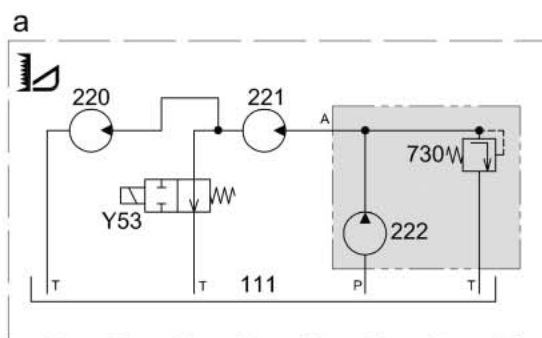
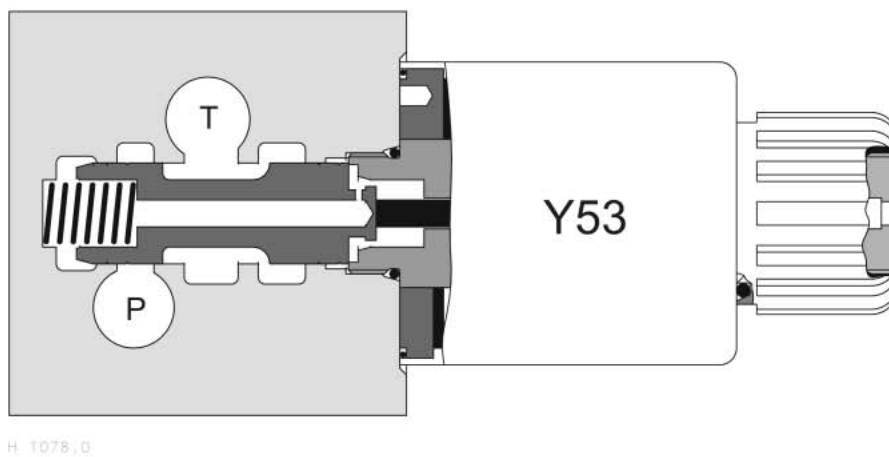
- Engage front attachment
- Start the diesel engine
- Engage the threshing mechanism
- Front attachment ON
- Turn in screw S on the reel rpm slow solenoid valve (Y96) – the piston retracts – the pump moves to "zero delivery".
- Adjust reel rpm to zero by means of screw E
- Restore initial machine condition

## - electric

In the basic position of the reel speed control variable-displacement pump sensor (B73), ensure that with the piston fully retracted (pump fully swivelled back), the signal voltage must be 0.5 V ( $\pm 0.1$  V).

**Notes:**

### 11.5 Rape Knife Drive (Standard Cutterbar) 2/2 way valve





**Key to diagram:**

111	Auxiliary hydraulic system oil tank (Rape) .....	2.0 litres
220	Left-hand knife drive hydraulic motor .....	OMM20
221	Right-hand knife drive hydraulic motor .....	OMM20
222	Hydraulic pump .....	9 cm <sup>3</sup>
730	Pressure relief valve .....	180±5 bar
Y53	Left rape knife circuit solenoid valve	
A	Consumer port	
P	Working hydraulics pump port	
T	Tank port	

**Description of function:**

When engaging the cutterbar, the rape knives hydraulic pump (222) is also driven. The solenoid valve (Y53) allows shutting off the left-hand knife from the cab.

The pressure relief valve (730) located on the left-hand machine side near the hydraulic pump (222) is set to **180±5 bar**.



## 12

### Vario Cutterbar

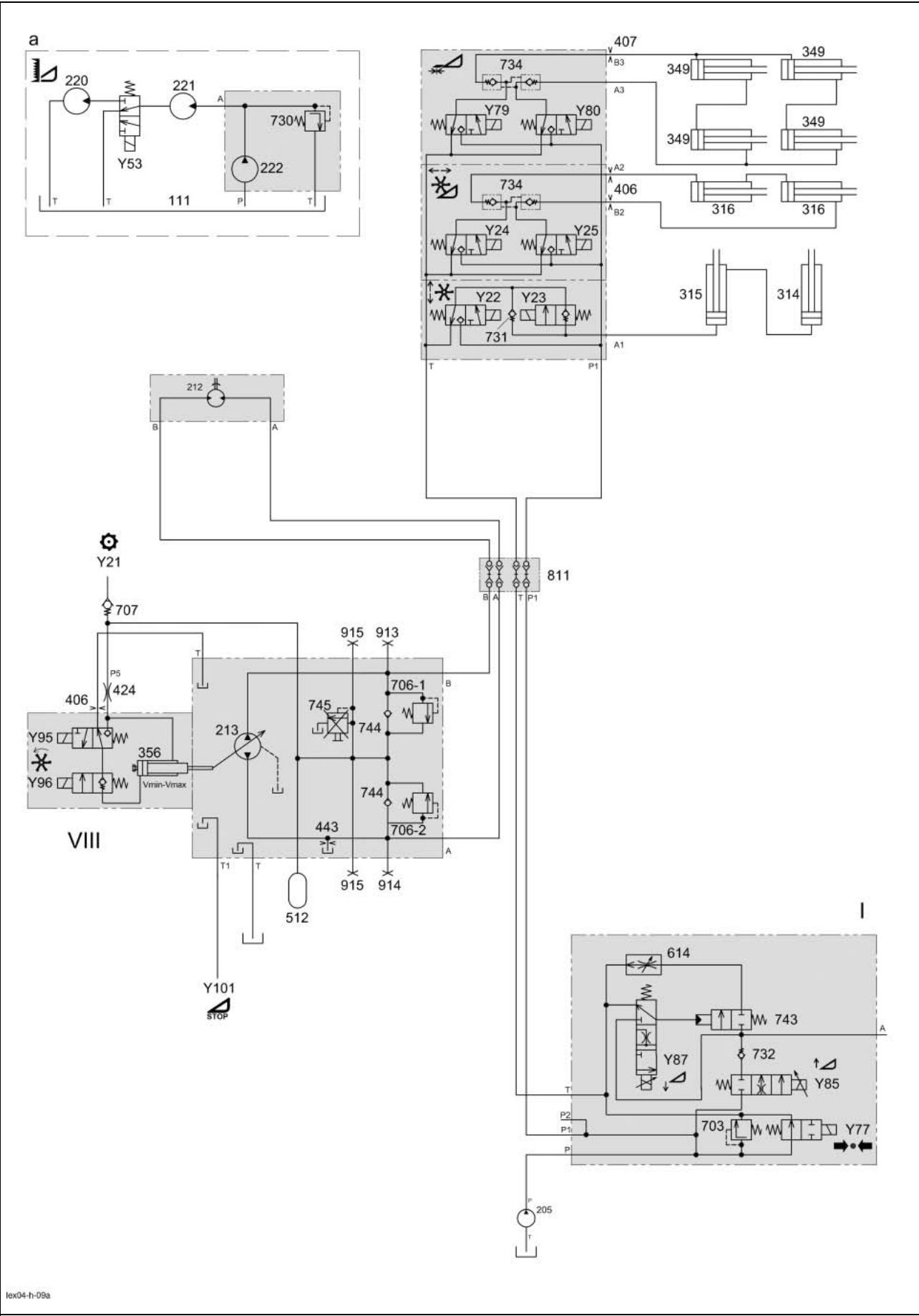
<b>12.1</b>	<b>Vario Cutterbar Circuit Diagram.....</b>	<b>12-4</b>
<b>12.2</b>	<b>Vertical Reel Adjustment (Vario Cutterbar) .....</b>	<b>12-6</b>
	3/3 way valve .....	12-6
	Hydraulic cylinders .....	12-8
<b>12.3</b>	<b>Horizontal Reel Adjustment (Vario Cutterbar).....</b>	<b>12-10</b>
	4/3 way valve with lock-up valve unit .....	12-10
	Hydraulic cylinders .....	12-12
<b>12.4</b>	<b>Reel Rpm Adjustment (Vario Cutterbar) .....</b>	<b>12-14</b>
	3/3 way valve .....	12-14
<b>12.5</b>	<b>Cutting Table Adjustment (Vario Cutterbar) .....</b>	<b>12-18</b>
	4/3 way valve .....	12-18
	Hydraulic cylinders .....	12-20
<b>12.6</b>	<b>Rape Knife Drive (Vario Cutterbar).....</b>	<b>12-22</b>
	3/2 way valve .....	12-22



## **12.1**

### **Vario Cutterbar Circuit Diagram**

12.1 Vario Cutterbar Circuit Diagram



Key to diagram:

- 111 Auxiliary hydraulic system oil tank (rape) ..... 2.0 litres
- 205 Working hydraulics pump ..... 14 / 19 cm<sup>3</sup>/rev.
- 212 Reel drive motor ..... 160 cm<sup>3</sup>/rev.
- 213 Reel drive pump ..... 15 cm<sup>3</sup>/rev.
- 220 Left-hand knife drive hydraulic motor ..... OMM20
- 221 Right-hand knife drive hydraulic motor..... OMM20
- 222 Hydraulic pump..... 16 cm<sup>3</sup>/rev.
- 314 Vertical reel adjustment slave cylinder
- 315 Vertical reel adjustment master cylinder
- 316 Horizontal reel adjustment hydraulic cylinder
- 349 VARIO table adjustment hydraulic cylinder
- 356 Reel drive control hydraulic cylinder
- 405 Orifice plate E ..... Ø 0.6 mm
- 406 Orifice plate ..... Ø 0.8 mm
- 407 Orifice plate ..... Ø 1.0 mm
- 408 Orifice plate H..... Ø 1.2 mm
- 426 Restrictor F..... Ø 0.8 mm
- 443 Reel drive flush-out restrictor ..... 0.9 mm
- 512 Reel drive accumulator
- 614 Flow control valve..... 5 - 50 l/min
- 703 Pressure relief valve..... 180<sup>+15</sup> bar
- 706 Pressure relief valve..... 159<sup>+4</sup> bar
- 707 Pressure holding valve (non-return valve)
- 730 Pressure relief valve..... 180±5 bar
- 731 Return line valve (non-return valve)
- 732 Non-return valve (Inlet valve)
- 734 Non-return valve (Lock-up valve unit)
- 743 Lower front attachment pilot valve
- 744 Reel drive feed valve
- 745 Reel drive feed pressure relief valve..... (blocked)
- 811 Multi-coupling
- 913 Reel drive high pressure forward measuring port
- 914 Reel drive high pressure reverse measuring port
- 915 Reel drive feed pressure measuring port
- Y21 Threshing mechanism solenoid valve
- Y22 Reel raise solenoid valve
- Y23 Reel lower solenoid valve
- Y24 Reel forward solenoid valve
- Y25 Reel reverse solenoid valve
- Y53 Left rape knife circuit solenoid valve
- Y77 Master valve solenoid valve
- Y79 VARIO cutting table forward solenoid valve
- Y80 VARIO cutting table backward solenoid valve
- Y85 Raise front attachment solenoid valve
- Y87 Lower front attachment solenoid valve
- Y95 Reel rpm fast solenoid valve
- Y96 Reel rpm slow solenoid valve
- Y101 Front attachment quick stop solenoid coil

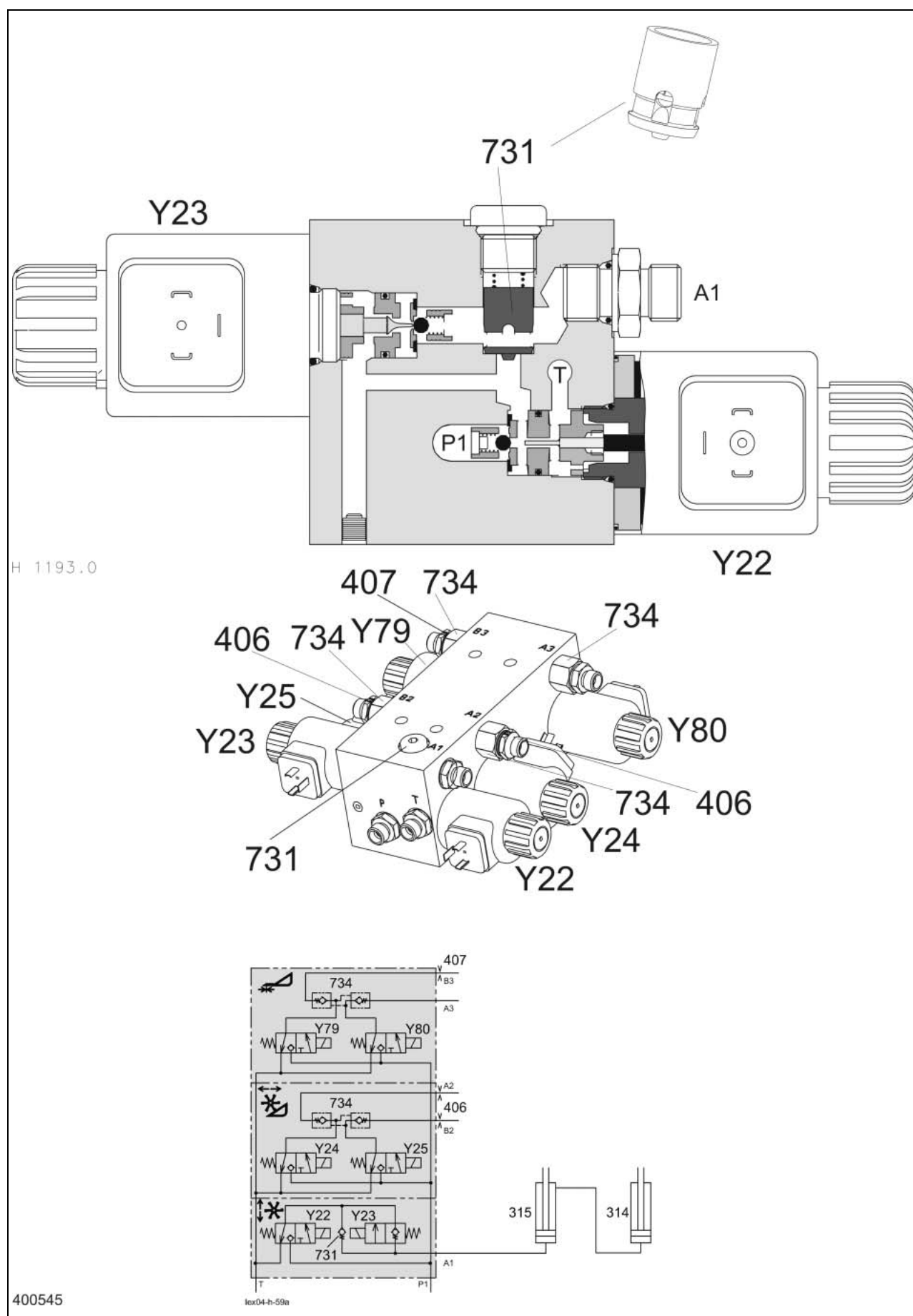
\* The measurable pressure at the pressure relief valves (703) of the reel drive pump consists of the static setting of the valves (140 bar) and the low pressure (19<sup>+4</sup> bar)!

**Key to diagram:**

I	Main valve block
VIII	Hydraulic reel drive valve block
a	Option
A	Consumer
B	Consumer
P	Working hydraulics pump
P1	Master valve / Working hydraulics pump
P2	Electro-hydraulic gearshift (EHS) / Working hydraulics pump
P5	Threshing mechanism hydraulic cylinder (low pressure)
T	Tank

## 12.2 Vertical Reel Adjustment (Vario Cutterbar)

3/3 way valve





**Key to diagram:**

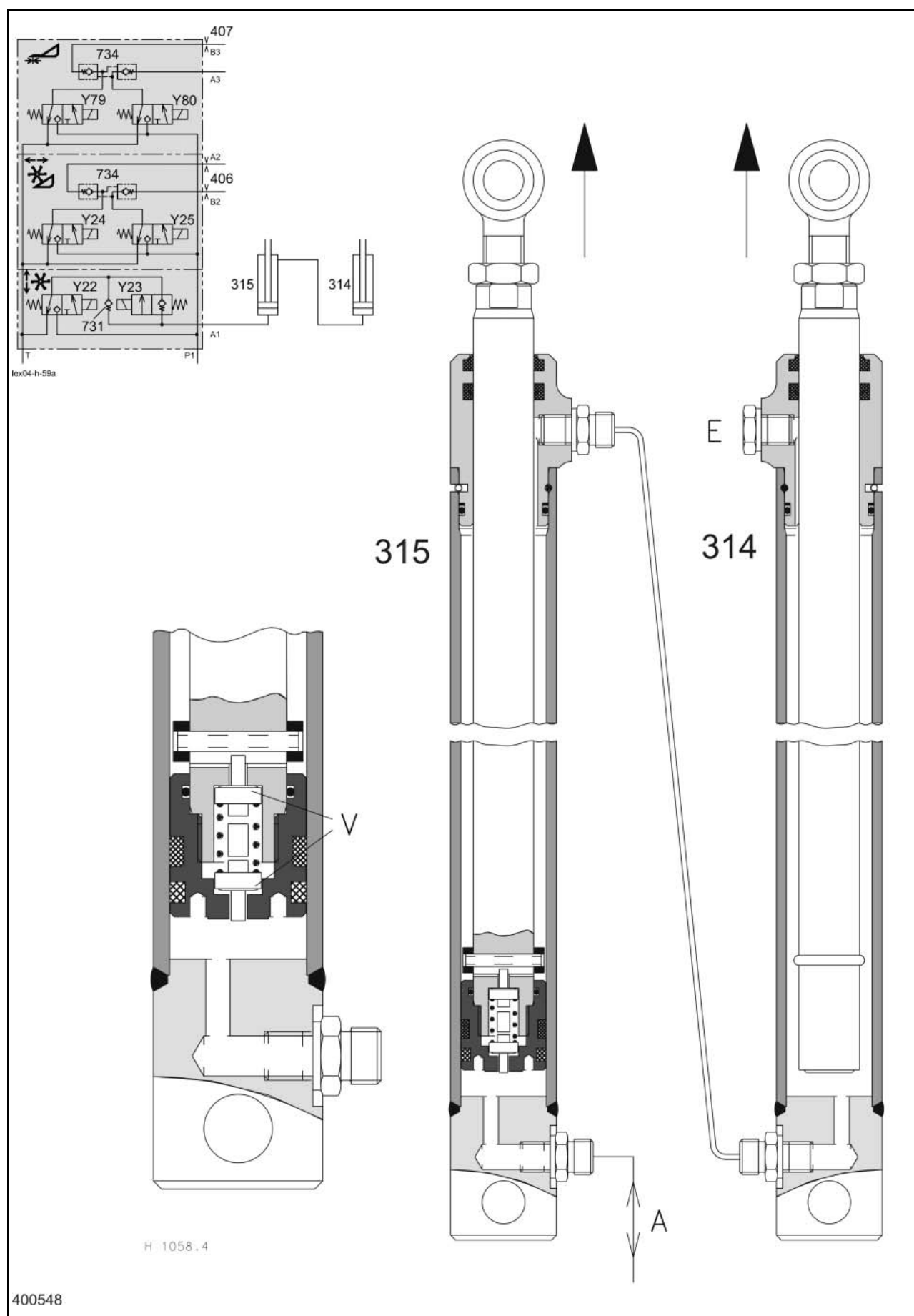
314	Reel raise/lower slave cylinder
315	Reel raise/lower master cylinder
406	Orifice plate ..... Ø 0.8 mm
407	Orifice plate ..... Ø 1.0 mm
731	Return line valve (non-return valve)
734	Lock-up valve unit (non-return valve)
Y22	Reel raise solenoid valve
Y23	Reel lower solenoid valve
Y24	Reel forward solenoid valve
Y25	Reel reverse solenoid valve
Y79	VARIO cutting table forward solenoid valve
Y80	VARIO cutting table backward solenoid valve
A1	Vertical reel adjustment port
A2	Horizontal reel adjustment port
A3	Cutting table adjustment port
B2	Horizontal reel adjustment port
B3	Cutting table adjustment port
P1	Master valve / Working hydraulics pump port
T	Tank port

**Description of function:**

Neutral	The hydraulic cylinder is tightly closed by the non-return valve (731) and the ball seat in the valve insert of solenoid valve (Y23).
Raise reel	The solenoid valve (Y22) and the master valve (Y77) are actuated at the same time. The pilot spool in solenoid valve (Y22) opens the ball in the valve insert and closes the return line to the tank. The pressure P1 which consequently rises opens the non-return valve (731) and the oil flows to the consumer port A1.
Lower reel	Solenoid valve (Y23) is actuated without the master valve (Y77). The pilot spool opens the ball in the valve insert and thus relieves the oil pressure to the tank via the valve insert of the unactuated solenoid valve (Y22).

**Vertical Reel Adjustment (Vario Cutterbar)**

Hydraulic cylinders



**Key to diagram:**

314	Reel raise/lower slave cylinder
315	Reel raise/lower master cylinder
406	Orifice plate ..... Ø 0.8 mm
407	Orifice plate ..... Ø 1.0 mm
731	Return line valve (non-return valve)
734	Lock-up valve unit (non-return valve)
Y22	Reel raise solenoid valve
Y23	Reel lower solenoid valve
Y24	Reel forward solenoid valve
Y25	Reel reverse solenoid valve
Y79	VARIO cutting table forward solenoid valve
Y80	VARIO cutting table backward solenoid valve
A1	Vertical reel adjustment port
A2	Horizontal reel adjustment port
A3	Cutting table adjustment port
B2	Horizontal reel adjustment port
B3	Cutting table adjustment port
P1	Master valve / Working hydraulics pump port
T	Tank port
E	Vent plug
V	Bottom valves

**Description of function:**

## Synchronism function

These hydraulic synchronism cylinders are designed so that the face end of the left cylinder (315) corresponds to the piston rod side of the right cylinder (314). The cylinders therefore are synchronous, making the connecting rods retract and extend in parallel, independent of their load.

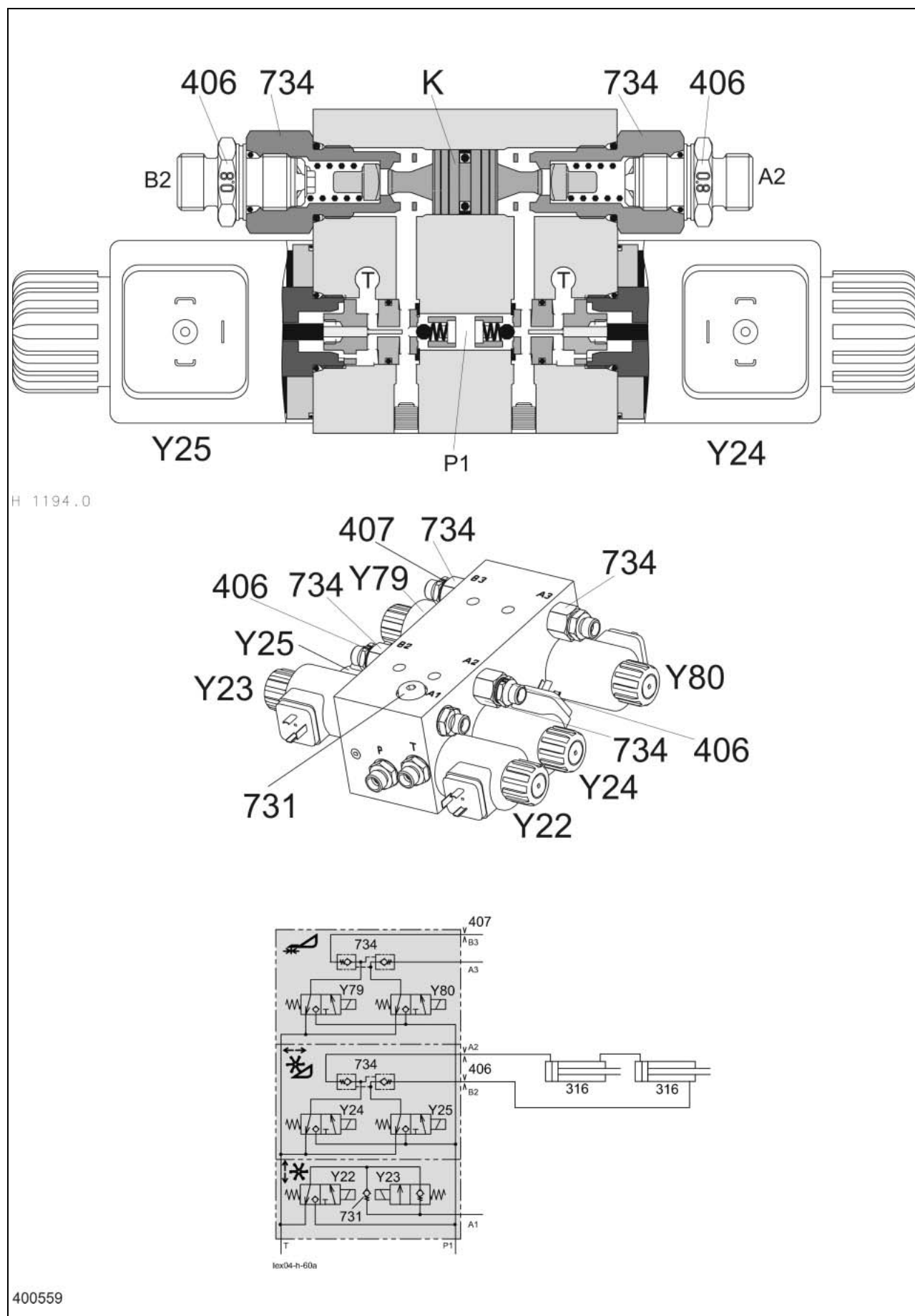
## Bottom valves

The bottom valves (V) in master cylinder (315) are opened upon reaching the upper end stop position so that the slave cylinder can be filled and vented.

**Note:** For repairs, it is recommended to remove the hydraulic cylinders in the raised reel position since the slave cylinder is filled only with the master cylinder fully extended. During this process support and secure the reel properly.

**12.3 Horizontal Reel Adjustment (Vario Cutterbar)**

4/3 way valve with lock-up valve unit



**Key to diagram:**

316	Horizontal reel adjustment hydraulic cylinder
406	Orifice plate .....Ø 0.8 mm
407	Orifice plate .....Ø 1.0 mm
731	Return line valve (non-return valve)
734	Non-return valve (Lock-up valve unit)
Y22	Reel raise solenoid valve
Y23	Reel lower solenoid valve
Y24	Reel forward solenoid valve
Y25	Reel reverse solenoid valve
Y79	VARIO cutting table forward solenoid valve
Y80	VARIO cutting table backward solenoid valve
A1	Vertical reel adjustment port
A2	Horizontal reel adjustment port
A3	Cutting table adjustment port
B2	Horizontal reel adjustment port
B3	Cutting table adjustment port
P1	Master valve / Working hydraulics pump port
T	Tank port
K	Piston

**Description of function:****Neutral**

Both sides of the hydraulic cylinder are tightly closed by the non-return valves (734) in the consumer ports A and B.

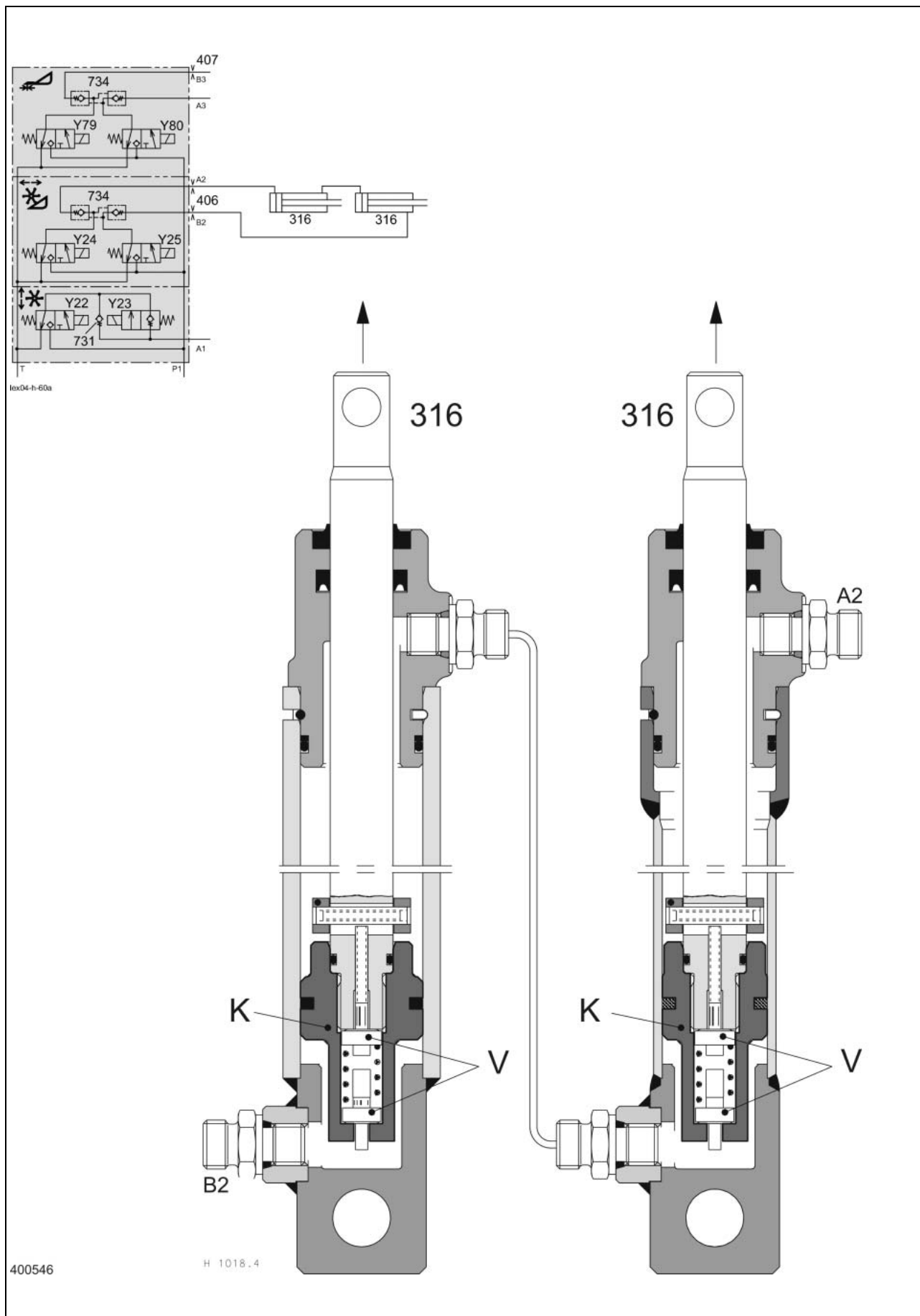
**Reel forward / reverse**

Depending on the necessary direction of movement, one of the solenoid valves (Y24/Y25) and, at the same time, the master valve (Y77) is actuated. The corresponding pilot spool opens the ball in the valve insert and closes the return line to the tank. The pressure which consequently rises builds up against piston (K) and opens the non-return valve (734) in port A2 or B2.

The return line of the hydraulic cylinder is thus released to the tank via the valve insert of the unactuated solenoid valve (Y24/Y25). The pressure rising further now opens the non-return valve (734) at the opposite port, making and the hydraulic cylinders retract or extend.

**Horizontal Reel Adjustment (Vario Cutterbar)**

Hydraulic cylinders



**Key to diagram:**

316	Horizontal reel adjustment hydraulic cylinder
406	Orifice plate .....Ø 0.8 mm
407	Orifice plate .....Ø 1.0 mm
731	Return line valve (non-return valve)
734	Non-return valve (Lock-up valve unit)
Y22	Reel raise solenoid valve
Y23	Reel lower solenoid valve
Y24	Reel forward solenoid valve
Y25	Reel reverse solenoid valve
Y79	VARIO cutting table forward solenoid valve
Y80	VARIO cutting table backward solenoid valve
A1	Vertical reel adjustment port
A2	Horizontal reel adjustment port
A3	Cutting table adjustment port
B2	Horizontal reel adjustment port
B3	Cutting table adjustment port
P1	Master valve / Working hydraulics pump port
T	Tank port
K	Piston
V	Bottom valves

**Description of function:****Synchronism function**

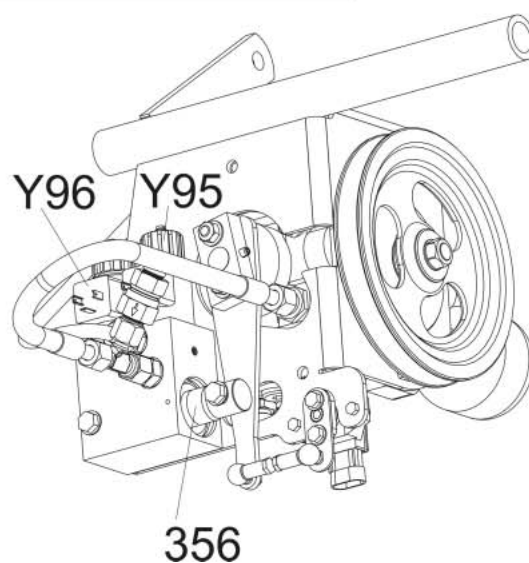
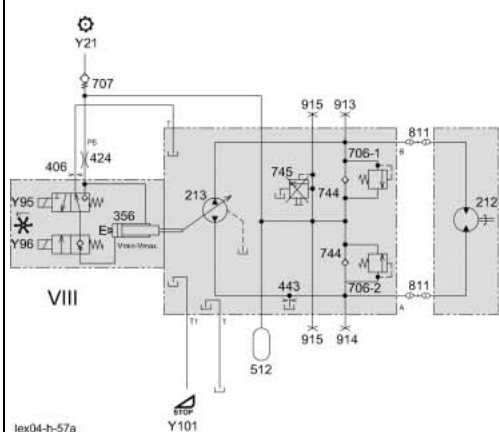
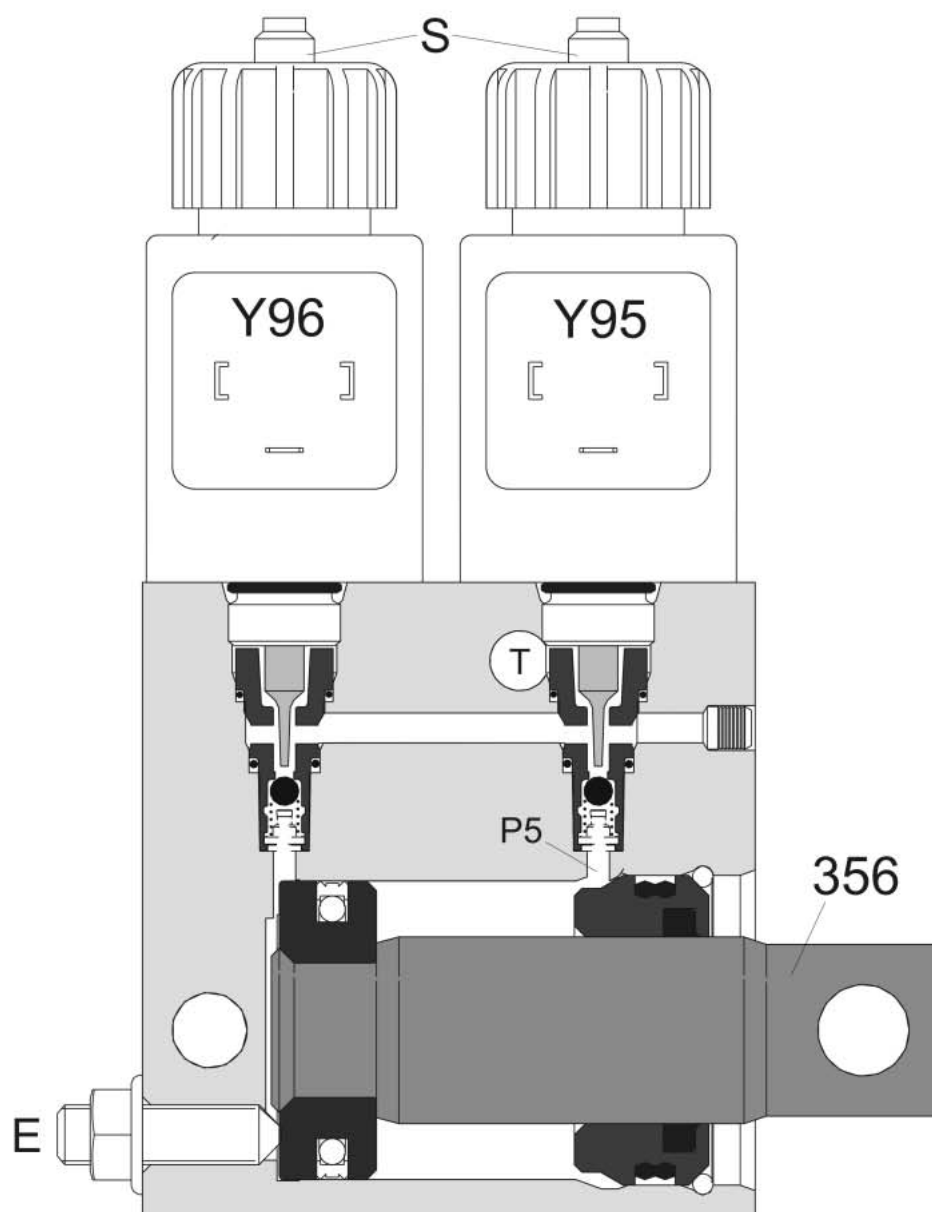
These hydraulic synchronism cylinders are designed so that the face end of the left cylinder corresponds to the piston rod side of the right cylinder. The cylinders therefore are synchronous, making the connecting rods retract and extend in parallel, independent of their load.

**Bottom valves**

The bottom valves (V) open every time an end position is reached so that air inclusions in the connection between the two cylinders can be flushed out.  
After a repair, the cylinders must be flushed in both end positions for approx. 15 sec.

## 12.4 Reel Rpm Adjustment (Vario Cutterbar)

3/3 way valve



400544



**Key to diagram:**

212	Reel drive motor	
213	Reel drive pump .....	15 cm <sup>3</sup> /rev.
356	Reel drive control hydraulic cylinder	
406	Orifice plate .....	0.8 mm
424	Restrictor .....	0.6 mm
443	Reel drive flush-out restrictor .....	0.9 mm
512	Reel drive accumulator	
706*	Pressure relief valve .....	159 <sup>+4</sup> bar
707	Pressure holding valve (non-return valve)	
744	Reel drive feed valve	
745	Reel drive feed pressure relief valve .....	(blocked)
811	Multi-coupling	
913	Reel drive high pressure forward measuring port	
914	Reel drive high pressure reverse measuring port	
915	Reel drive feed pressure measuring port	
Y21	Threshing mechanism solenoid valve	
Y95	Reel rpm fast solenoid valve	
Y96	Reel rpm slow solenoid valve	
Y101	Front attachment quick stop solenoid coil	
VIII	Hydraulic reel drive valve block	
A	Consumer port	
B	Consumer port	
E	Reel pump adjusting screw	
K	Piston	
P5	Low-pressure hydraulics port	
S	Emergency operation screw	
T	Tank	

\* The measurable pressure at the pressure relief valves (703) of the reel drive pump consists of the static setting of the valves (140 bar) and the low pressure (19<sup>+4</sup> bar)!

**Description of function:**

The hydraulic reel rpm control is realised using a variable displacement-type axial piston pump (213).

The axial piston pump (213) is adjusted only when a cutterbar or a maize picker with hydraulic down maize augers is engaged and activated. When operating without front attachment or with another front attachment, there is no axial piston pump adjustment, it remains in its basic position.

When the threshing mechanism is engaged, the system is supplied with oil by solenoid valve (Y21) (low-pressure hydraulics). The hydraulic cylinder (356) is controlled by the solenoid valves (Y95/Y96) and determines the swivel angle and therefore the volumetric delivery of pump (213). The reel module actuates the solenoid valves (Y95/Y96) in a modulated way.

After engaging the front attachment, the axial piston pump (213) is driven mechanically and delivers the required volume flow. The sense of rotation of the pump (forward or backward) depends on the sense of rotation of the front attachment.

To protect the system against overheating, an oil quantity is permanently flushed out via restrictor (443) in the return line circuit.

The pressure relief valves (706) safeguard the system at 160 bar (abs) in the respective high-pressure circuits.

If the reel runs on when the threshing mechanism is shut off (without oil supply), the accumulator (512) avoids running dry of the pump and the motor.

**Note:** After shutting off the front attachment, the reel rpm slow solenoid valve (Y96) is energized for another 4 seconds in order to fully retract the piston in the reel drive control hydraulic cylinder (356) (zero delivery by pump). The accumulator (512) additionally supports this process.

**Pump setting**

- hydraulic

The basic setting of the axial piston pump (213) must be set to zero delivery by means of screw E.

- Engage front attachment
- Start the diesel engine
- Engage the threshing mechanism
- Front attachment ON
- Turn in screw S on the reel rpm slow solenoid valve (Y96) – the piston retracts – the pump moves to "zero delivery".
- Adjust reel rpm to zero by means of screw E
- Restore initial machine condition

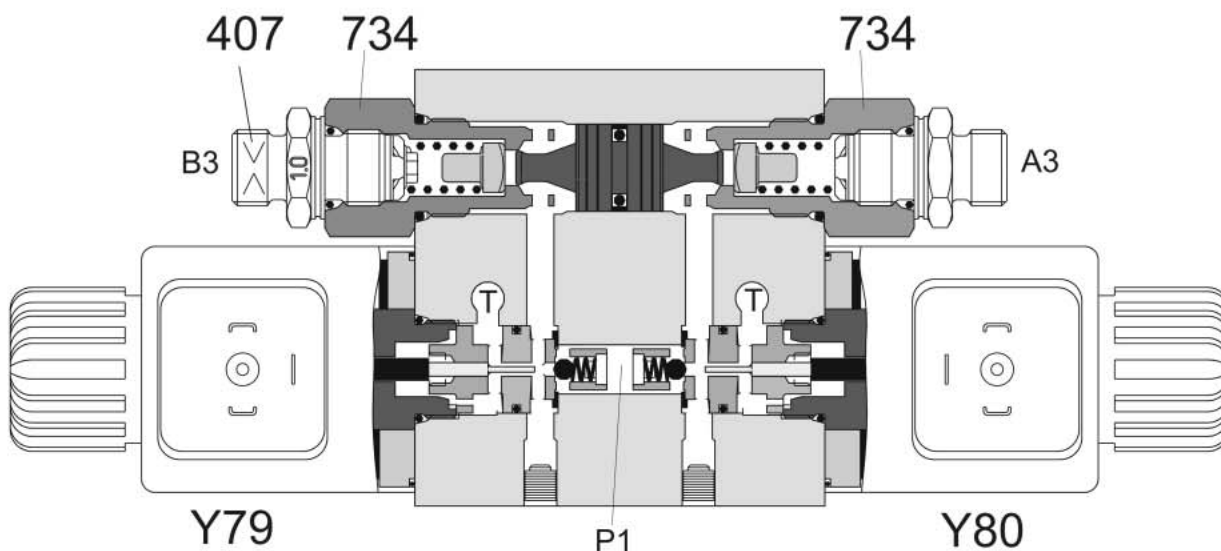
- electric

In the basic position of the reel speed control variable-displacement pump sensor (B73), ensure that with the piston fully retracted (pump fully swivelled back), the signal voltage must be 0.5 V ( $\pm 0.1V$ ).

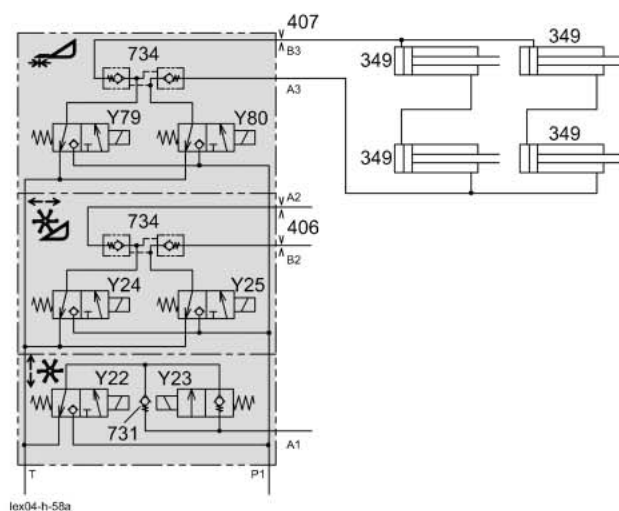
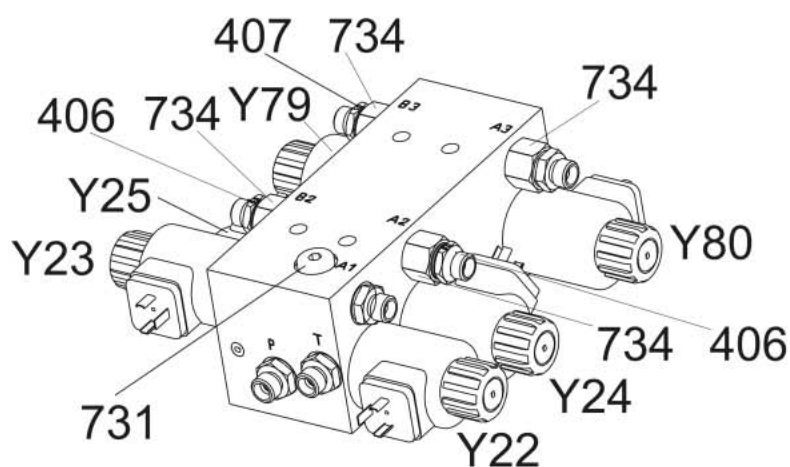
**Notes:**

**12.5 Cutting Table Adjustment (Vario Cutterbar)**

4/3 way valve



H 1196.0



lex04-h-58a

400371

**Key to diagram:**

349	VARIO table adjustment hydraulic cylinder
406	Orifice plate ..... Ø 0.8 mm
407	Orifice plate ..... Ø 1.0 mm
731	Return line valve (non-return valve)
734	Non-return valve (Lock-up valve unit)
Y22	Reel raise solenoid valve
Y23	Reel lower solenoid valve
Y24	Reel forward solenoid valve
Y25	Reel reverse solenoid valve
Y79	VARIO cutting table forward solenoid valve
Y80	Vario cutting table backward solenoid valve
A1	Vertical reel adjustment port
A2	Horizontal reel adjustment port
A3	Cutting table adjustment port
B2	Horizontal reel adjustment port
B3	Cutting table adjustment port
P1	Master valve / Working hydraulics pump port
T	Tank port
K	Piston

**Description of function:****Neutral**

Both sides of the hydraulic cylinder are tightly closed by the non-return valves (734) in the consumer ports A and B.

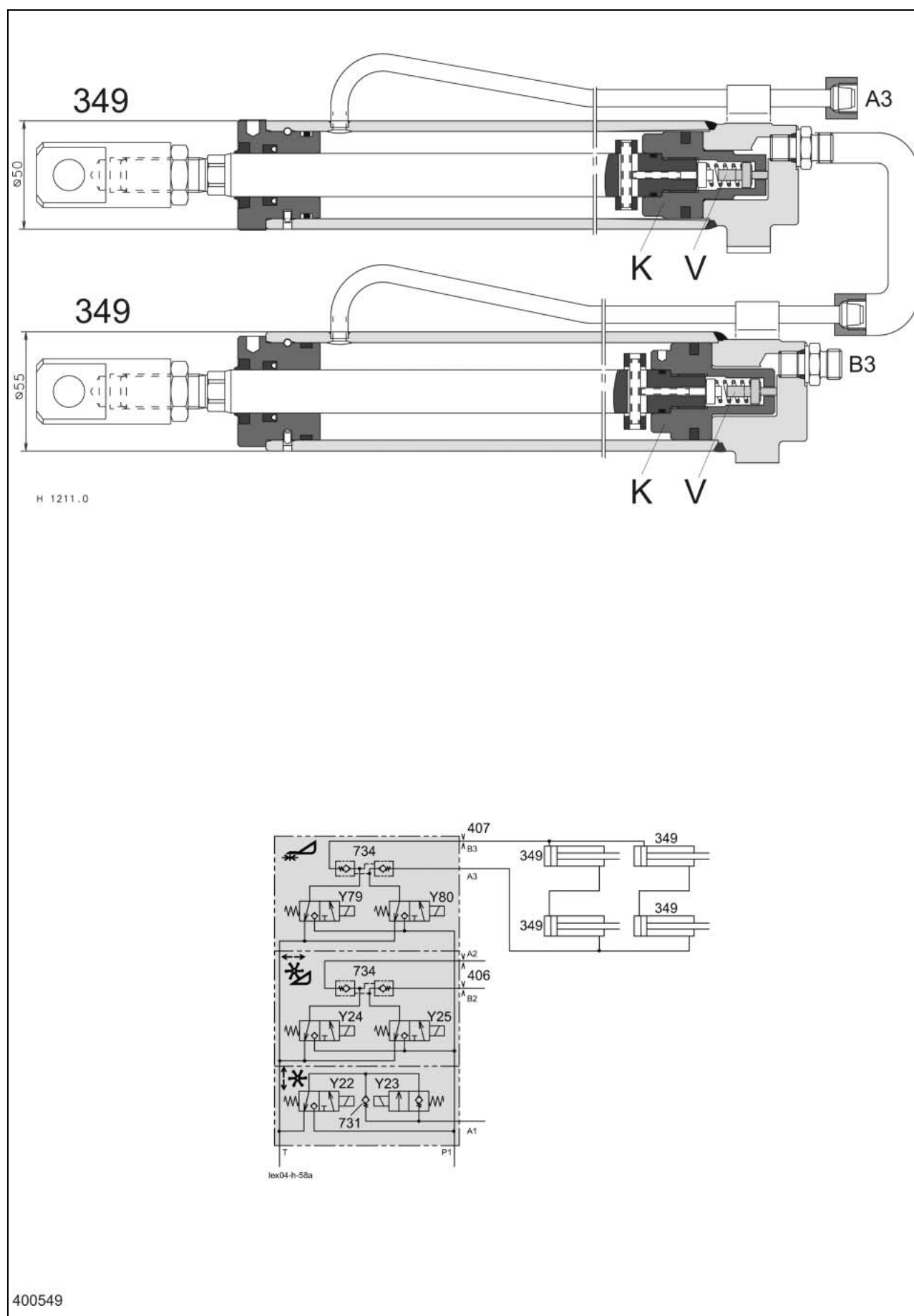
**Cutting table forward / backward**

Depending on the necessary direction of movement, one of the solenoid valves (Y79/Y80) and, at the same time, the master valve (Y77) is actuated. The corresponding pilot spool opens the ball in the valve insert and closes the return line to the tank. The pressure which consequently rises builds up against piston (K) and opens the non-return valve (734) in port A or B.

The return line of the hydraulic cylinder is thus released to the tank via the valve insert of the unactuated solenoid valve (Y79/Y80). The pressure rising further now opens the non-return valve (734) at the opposite port and the hydraulic cylinders are retracted or extended.

**Cutting Table Adjustment (Vario Cutterbar)**

Hydraulic cylinders



**Key to diagram:**

349	Vario table adjustment hydraulic cylinder	
406	Orifice plate .....	Ø 0.8 mm
407	Orifice plate .....	Ø 1.0 mm
731	Return line valve (non-return valve)	
734	Non-return valve (Lock-up valve unit)	
Y22	Reel raise solenoid valve	
Y23	Reel lower solenoid valve	
Y24	Reel forward solenoid valve	
Y25	Reel reverse solenoid valve	
Y79	Vario cutting table forward solenoid valve	
Y80	Vario cutting table backward solenoid valve	
A1	Vertical reel adjustment port	
A2	Horizontal reel adjustment port	
A3	Cutting table adjustment port	
B2	Horizontal reel adjustment port	
B3	Cutting table adjustment port	
P1	Master valve / Working hydraulics pump port	
T	Tank port	
K	Piston	
V	Bottom valves	

**Description of function:****Synchronism function**

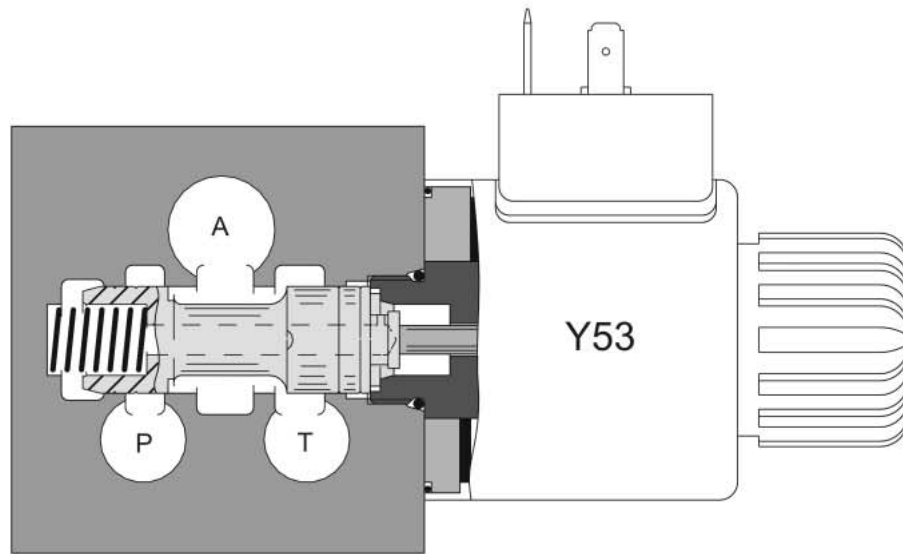
These hydraulic synchronism cylinders are designed so that the face end of the left cylinder corresponds to the piston rod side of the right cylinder. The cylinders therefore are synchronous, making the connecting rods retract and extend in parallel, independent of their load.

**Bottom valves**

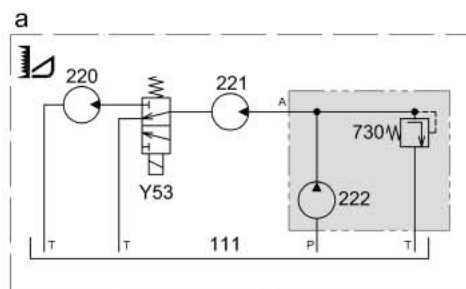
The bottom valves (V) open every time an end position is reached so that air inclusions in the connection between the two cylinders can be flushed out.  
After a repair, the cylinders must be flushed in both end positions for approx. 15 sec.

## 12.6 Rape Knife Drive (Vario Cutterbar)

3/2 way valve



H 1093.0



400550



**Key to diagram:**

220	Left-hand knife drive hydraulic motor.....	OMM20
221	Right-hand knife drive hydraulic motor .....	OMM20
222	Hydraulic pump .....	16 cm <sup>3</sup> /rev.
730	Pressure relief valve .....	140±5 bar
Y53	Left rape knife circuit solenoid valve	
a	Option	
A	Consumer port	
P	Working hydraulics pump port	
T	Tank port	

**Description of function:**

When engaging the cutterbar, the rape knives hydraulic pump (222) is also driven. The delivered volume flow drive the right-hand rape knife drive motor (221).

The solenoid valve (Y53) switches the left-hand knife off or on.

The pressure relief valve (730) located on the left-hand machine side near the hydraulic pump (222) is set to **140±5 bar**.



**13****Folding Cutterbar**

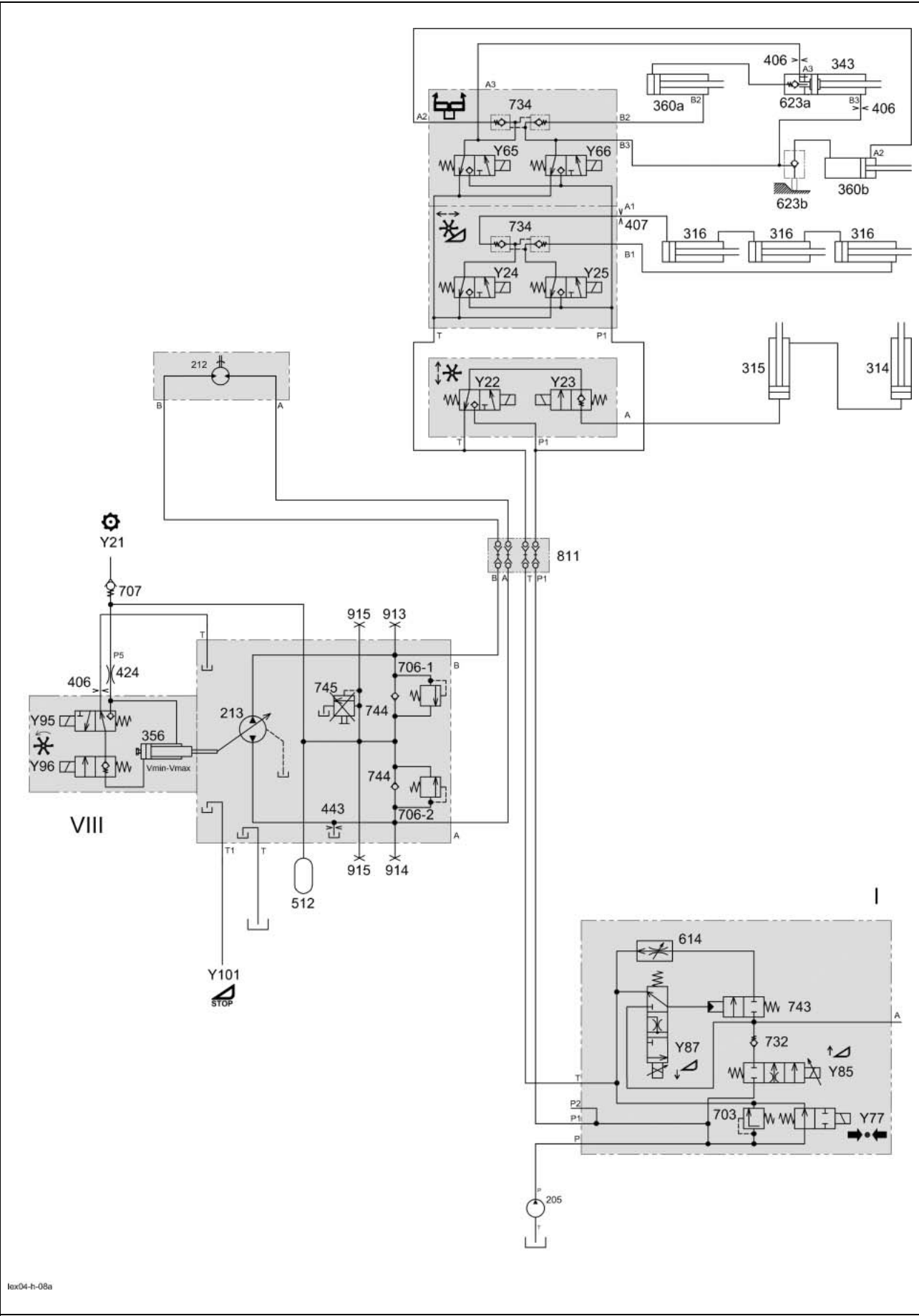
<b>13.1</b>	<b>Folding Cutterbar Circuit Diagram.....</b>	<b>13-4</b>
<b>13.2</b>	<b>Vertical Reel Adjustment (Folding Cutterbar) .....</b>	<b>13-6</b>
	3/3 way valve with shut-off valve .....	13-6
	Hydraulic cylinders .....	13-8
<b>13.3</b>	<b>Horizontal Reel Adjustment (Folding Cutterbar).....</b>	<b>13-10</b>
	4/3 way valve with lock-up valve unit .....	13-10
	Hydraulic cylinders .....	13-12
<b>13.4</b>	<b>Reel Rpm Adjustment (Folding Cutterbar) .....</b>	<b>13-14</b>
	3/3 way valve .....	13-14
<b>13.5</b>	<b>Folding the cutterbar.....</b>	<b>13-18</b>
	4/3 way valve with lock-up valve unit .....	13-18
	Hydraulic cylinders .....	13-20



## **13.1**

### **Folding Cutterbar Circuit Diagram**

13.1 Folding Cutterbar Circuit Diagram



Key to diagram:

- 110

Oil tank
- 205

Working hydraulics pump .....

14/19 cm<sup>3</sup>
- 212

Reel drive motor
- 213

Reel drive pump .....

15 cm<sup>3</sup>
- 224

Chaff / straw spreader drive pump
- 312

Threshing mechanism clutch hydraulic cylinder
- 314

Vertical reel adjustment slave cylinder
- 315

Vertical reel adjustment master cylinder
- 316

Horizontal reel adjustment hydraulic cylinder
- 343

Cutterbar fold hydraulic cylinder
- 356

Reel drive control hydraulic cylinder
- 360(a)

Transport position lock hydraulic cylinder
- 360(b)

Working position lock hydraulic cylinder
- 405

Orifice plate .....

0.6 mm
- 406

Orifice plate .....

0.8 mm
- 407

Orifice plate .....

1.0 mm
- 408

Orifice plate .....

1.2 mm
- 424

Restrictor .....

0.6 mm
- 426

Restrictor .....

0.8 mm
- 443

Reel drive flush-out restrictor .....

0.9 mm
- 512

Reel drive accumulator
- 614

Flow control valve.....

5 - 50 l/min
- 623(a)

Non-return valve (pilot-controlled)
- 623(b)

Non-return valve (pilot-controlled)
- 703

Pressure relief valve .....

180<sup>+15</sup> bar
- 706\*

Pressure relief valve .....

159<sup>+4</sup> bar
- 707

Pressure holding valve (non-return valve)
- 732

Non-return valve (inlet valve)
- 734

Non-return valve (Lock-up valve unit)
- 743

Lower front attachment pilot valve
- 744

Reel drive feed valve
- 745

Reel drive feed pressure relief valve .....

(blocked)
- 811

Multi-coupling
- 913

Reel drive high pressure forward measuring port
- 914

Reel drive high pressure backward measuring port
- 915

Reel drive feed pressure measuring port
- I

Main valve block
- VIII

Reel drive valve block
- \*

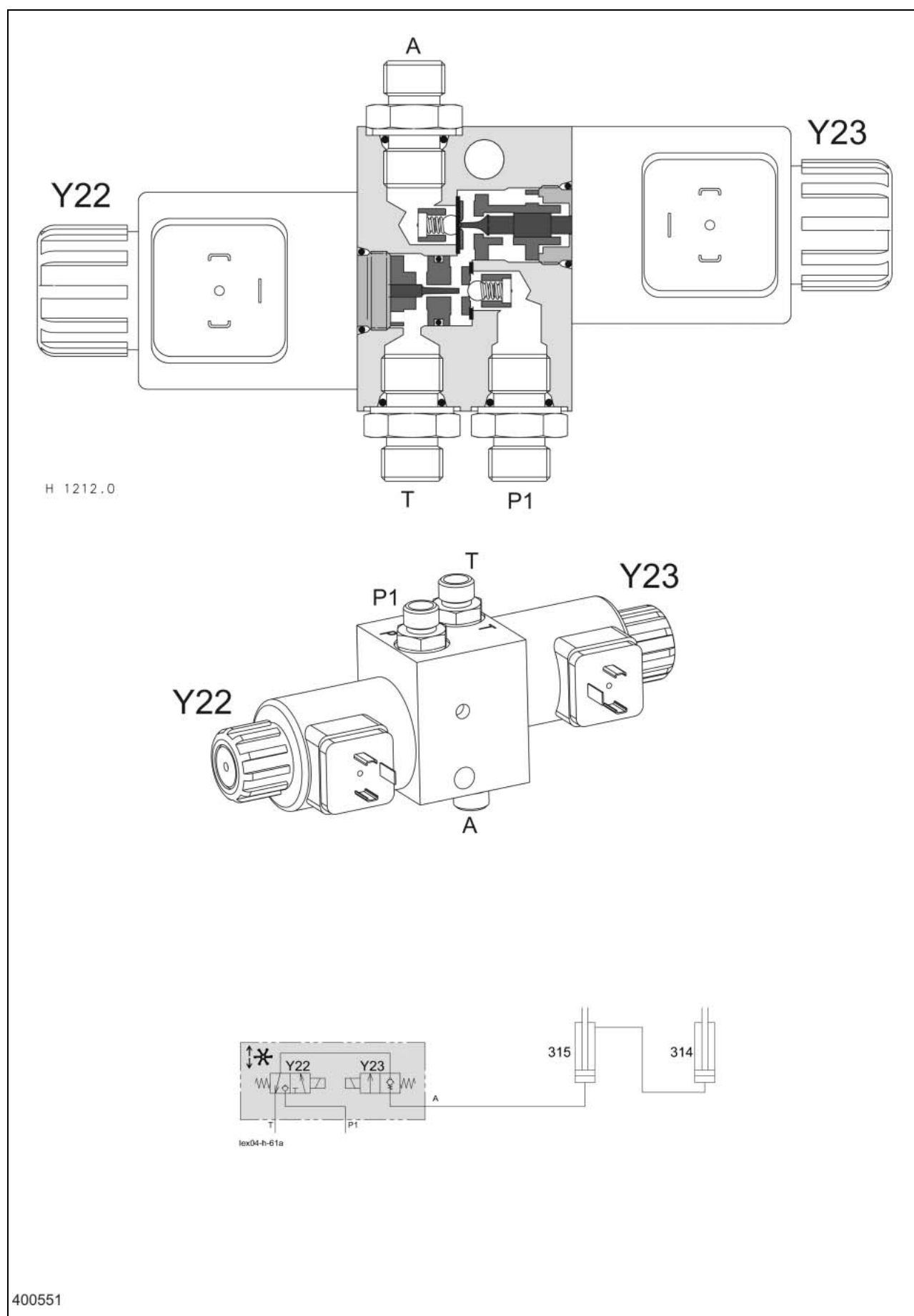
The measurable pressure at the pressure relief valves (703) of the reel drive pump consists of the static setting of the valves (140 bar) and the low pressure (19<sup>+4</sup> bar)!

**Key to diagram:**

Y21	Threshing mechanism solenoid valve
Y22	Reel raise solenoid valve
Y23	Reel lower solenoid valve
Y24	Reel forward solenoid valve
Y25	Reel reverse solenoid valve
Y65	Fold cutterbar to working position solenoid valve
Y66	Fold cutterbar to transport position solenoid valve
Y77	Master valve solenoid valve
Y85	Raise front attachment solenoid valve
Y87	Lower front attachment solenoid valve
Y95	Reel rpm fast solenoid valve
Y96	Reel rpm slow solenoid valve
Y101	Front attachment quick stop solenoid coil
A	Consumer port
B	Consumer port
P	Working hydraulics pump port
P1	Master valve / Working hydraulics pump port
P5	Threshing mechanism hydraulic cylinder (low pressure) port
S	Reel pump adjusting screw
T	Tank port

**13.2 Vertical Reel Adjustment (Folding Cutterbar)**

3/3 way valve with shut-off valve





**Key to diagram:**

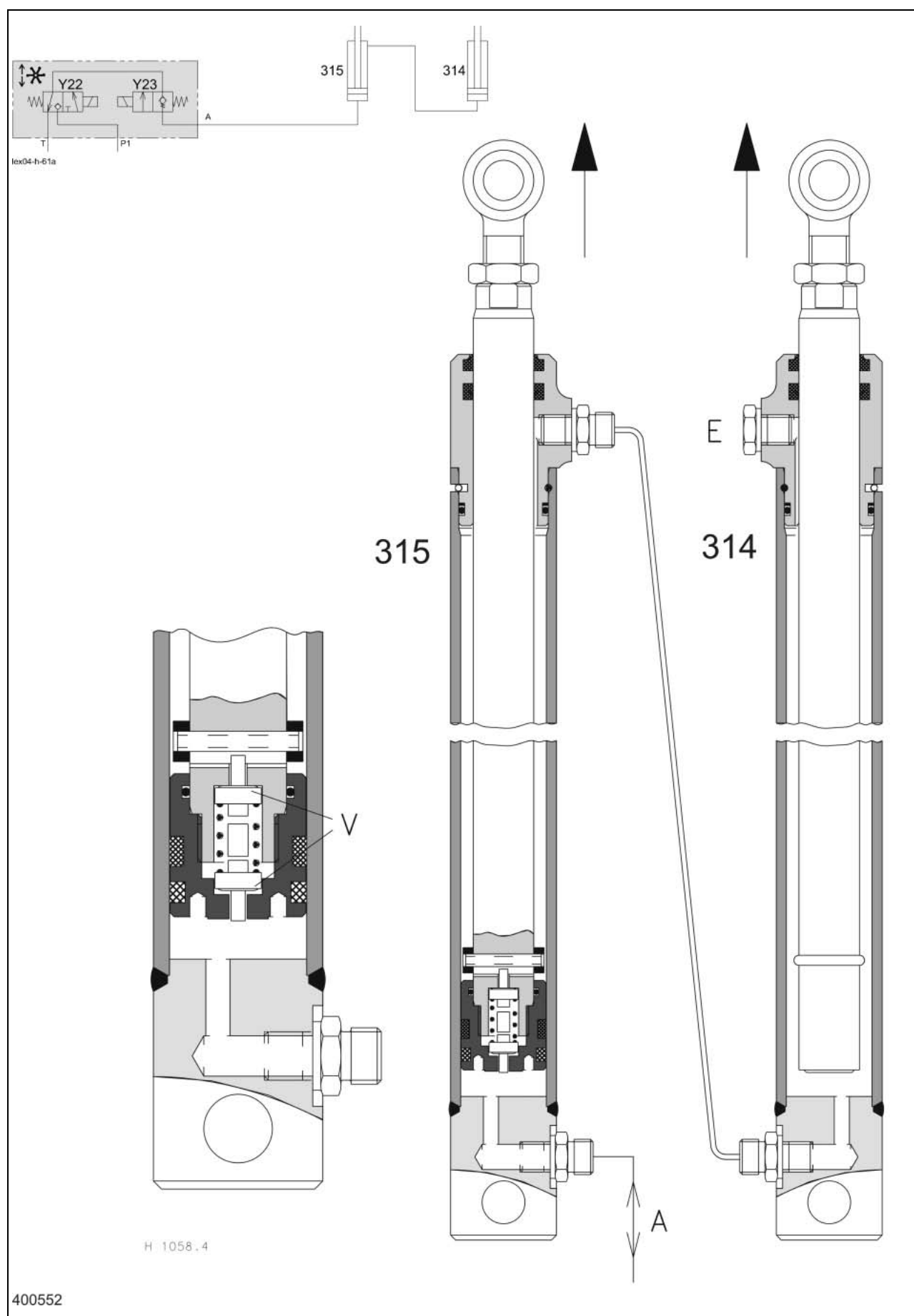
314	Vertical reel adjustment slave cylinder
315	Vertical reel adjustment master cylinder
Y22	Reel raise solenoid valve
Y23	Reel lower solenoid valve
A	Consumer port
P1	Master valve / Working hydraulics pump port
T	Tank port

**Description of function:**

Neutral	Hydraulic cylinder (315) is tightly closed by the ball seat in the valve insert of consumer port A.
Raise reel	The solenoid valve (Y22) and the master valve (Y77) are actuated at the same time. The pilot spool opens the ball in the valve insert and closes the return line to the tank. The pressure which consequently rises opens the ball in the valve insert of the unactuated solenoid valve (Y23) and the oil flows to the consumer port A.
Lower reel	Solenoid valve (Y23) is actuated without the master valve (Y77). The pilot spool in question opens the ball in the valve insert against the pressure at port A and thus opens the connection to the tank via the valve insert of the unactuated solenoid valve (Y22).

**Vertical Reel Adjustment (Folding Cutterbar)**

Hydraulic cylinders



**Key to diagram:**

314	Vertical reel adjustment slave cylinder
315	Vertical reel adjustment master cylinder
Y22	Reel raise solenoid valve
Y23	Reel lower solenoid valve
A	Consumer port
P1	Master valve / Working hydraulics pump port
T	Tank port
V	Bottom valves
E	Vent plug

**Description of function:**

## Synchronism function

These hydraulic synchronism cylinders are designed so that the face end of the left cylinder (315) corresponds to the piston rod side of the right cylinder (314). The cylinders therefore are synchronous, making the connecting rods retract and extend in parallel, independent of their load.

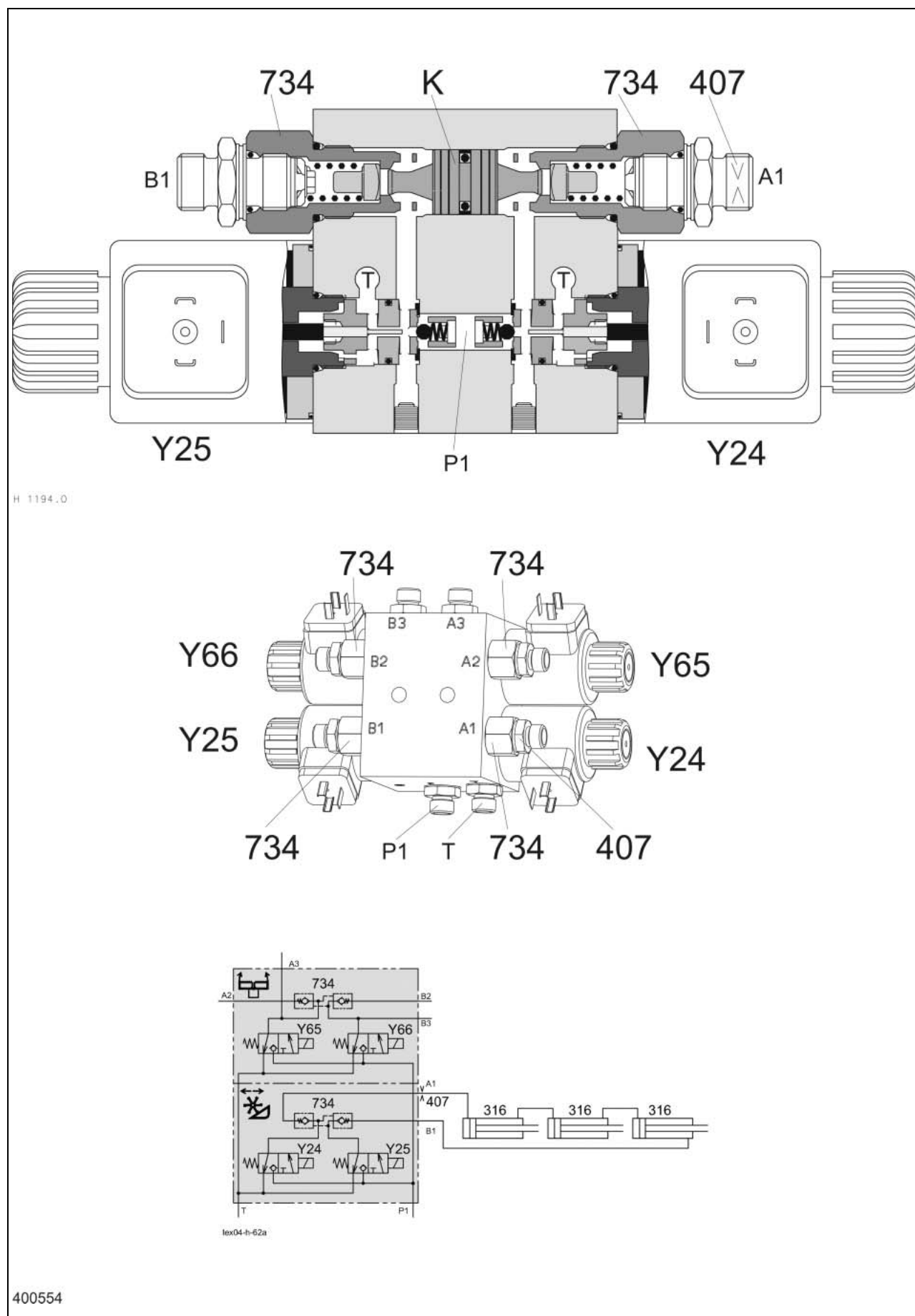
## Bottom valves

The bottom outlet valves (V) in master cylinder (315) are opened upon reaching the upper stop position so that the slave cylinder can be filled and vented.

**Note:** For repairs, it is recommended to remove the hydraulic rams in the raised reel position since the slave cylinder is filled only with the master cylinder fully extended. During this process support and secure the reel properly.

**13.3 Horizontal Reel Adjustment (Folding Cutterbar)**

4/3 way valve with lock-up valve unit



**Key to diagram:**

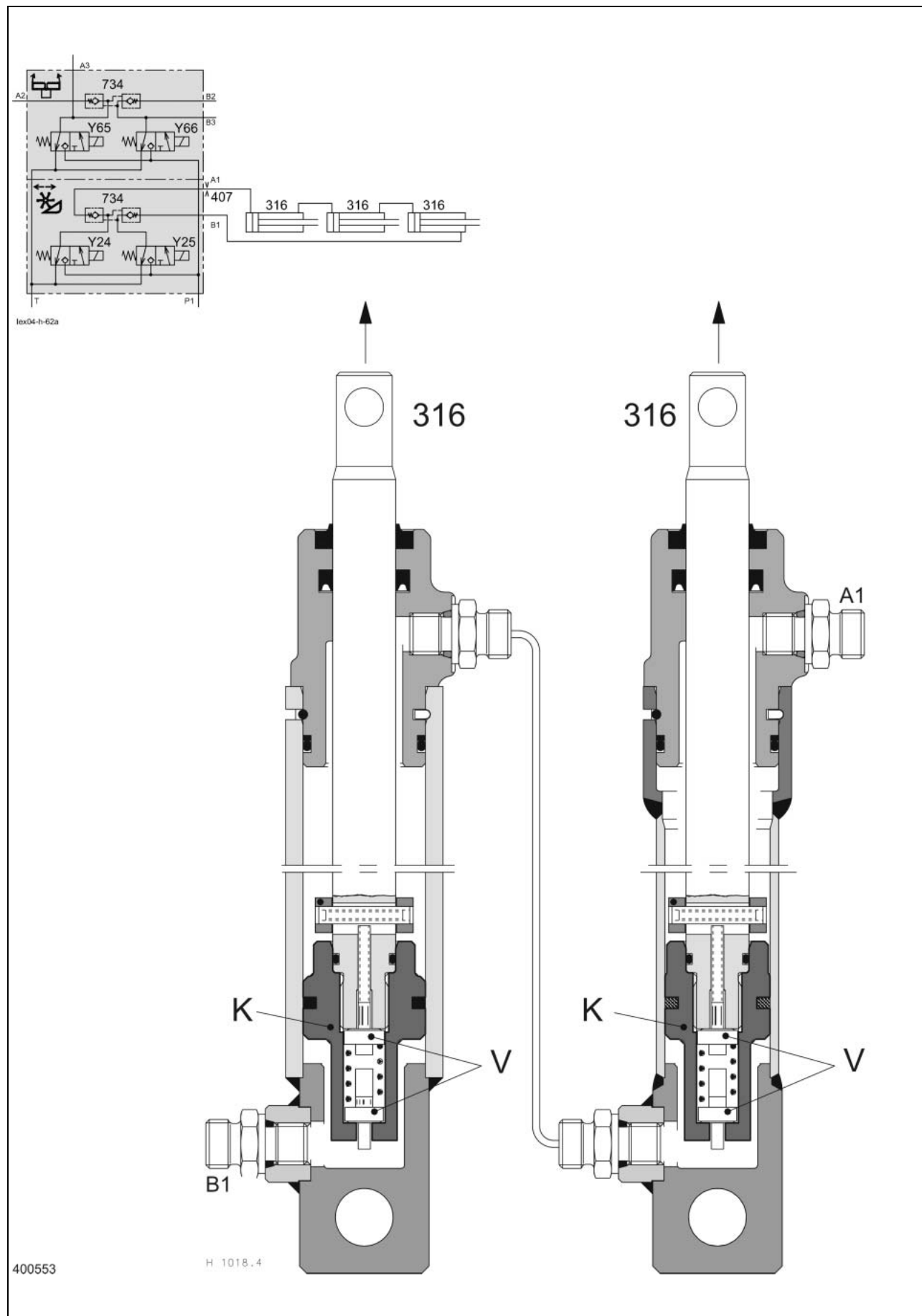
316	Horizontal reel adjustment hydraulic cylinder
407	Orifice plate G ..... 1.0 mm
734	Non-return valve (Lock-up valve unit)
Y24	Reel forward solenoid valve
Y25	Reel reverse solenoid valve
Y65	Solenoid valve
Y66	Solenoid valve
A1	Horizontal reel adjustment port
B1	Horizontal reel adjustment port
P1	Master valve / Working hydraulics pump port
T	Tank port
K	Piston

**Description of function:**

Neutral	Both sides of the hydraulic cylinder are tightly closed by the non-return valves (734) in the consumer ports A and B.
Reel forward / reverse	<p>Depending on the necessary direction of movement, one of the solenoid valves (Y24/Y25) and, at the same time, the master valve (Y77) is actuated. The corresponding pilot spool opens the ball in the valve insert and closes the return line to the tank. The pressure which consequently rises builds up against piston (K) and opens the non-return valve (734) in port A1 or B1.</p> <p>The return line of the hydraulic cylinder is thus released to the tank via the valve insert of the unactuated solenoid valve (Y24/Y25). The pressure rising further now opens the non-return valve (734) at the opposite port and the hydraulic cylinders are retracted or extended.</p>

**Horizontal Reel Adjustment (Folding Cutterbar)**

Hydraulic cylinders



**Key to diagram:**

316	Horizontal reel adjustment hydraulic cylinder
407	Orifice plate G ..... 1.0 mm
734	Non-return valve (Lock-up valve unit)
Y24	Reel forward solenoid valve
Y25	Reel reverse solenoid valve
Y65	Solenoid valve
Y66	Solenoid valve
A1	Horizontal reel adjustment port
B1	Horizontal reel adjustment port
P1	Master valve / Working hydraulics pump port
T	Tank port
K	Piston
V	Bottom valves

**Description of function:****Synchronism function**

These hydraulic synchronism cylinders are designed so that the face end of the left cylinder corresponds to the piston rod side of the right cylinder. The cylinders therefore are synchronous, making the connecting rods retract and extend in parallel, independent of their load.

**Bottom valves**

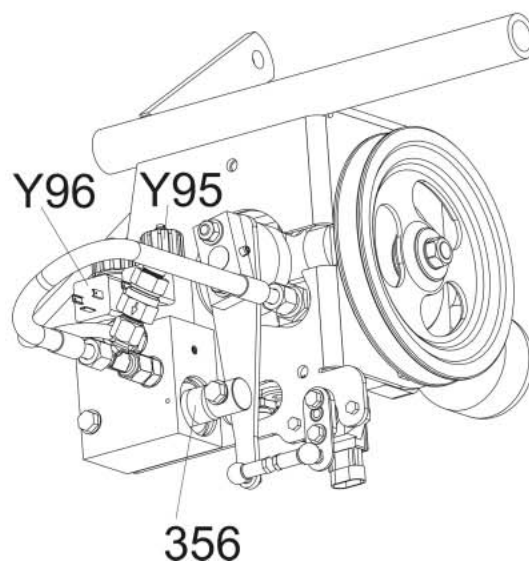
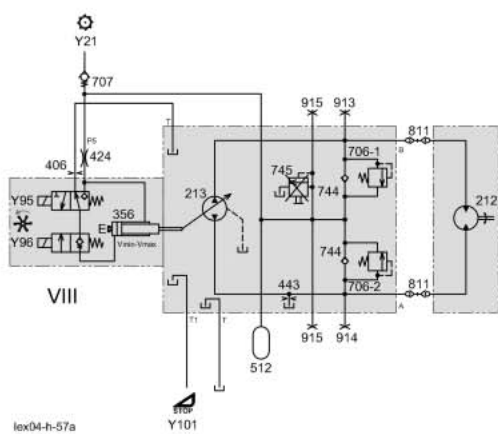
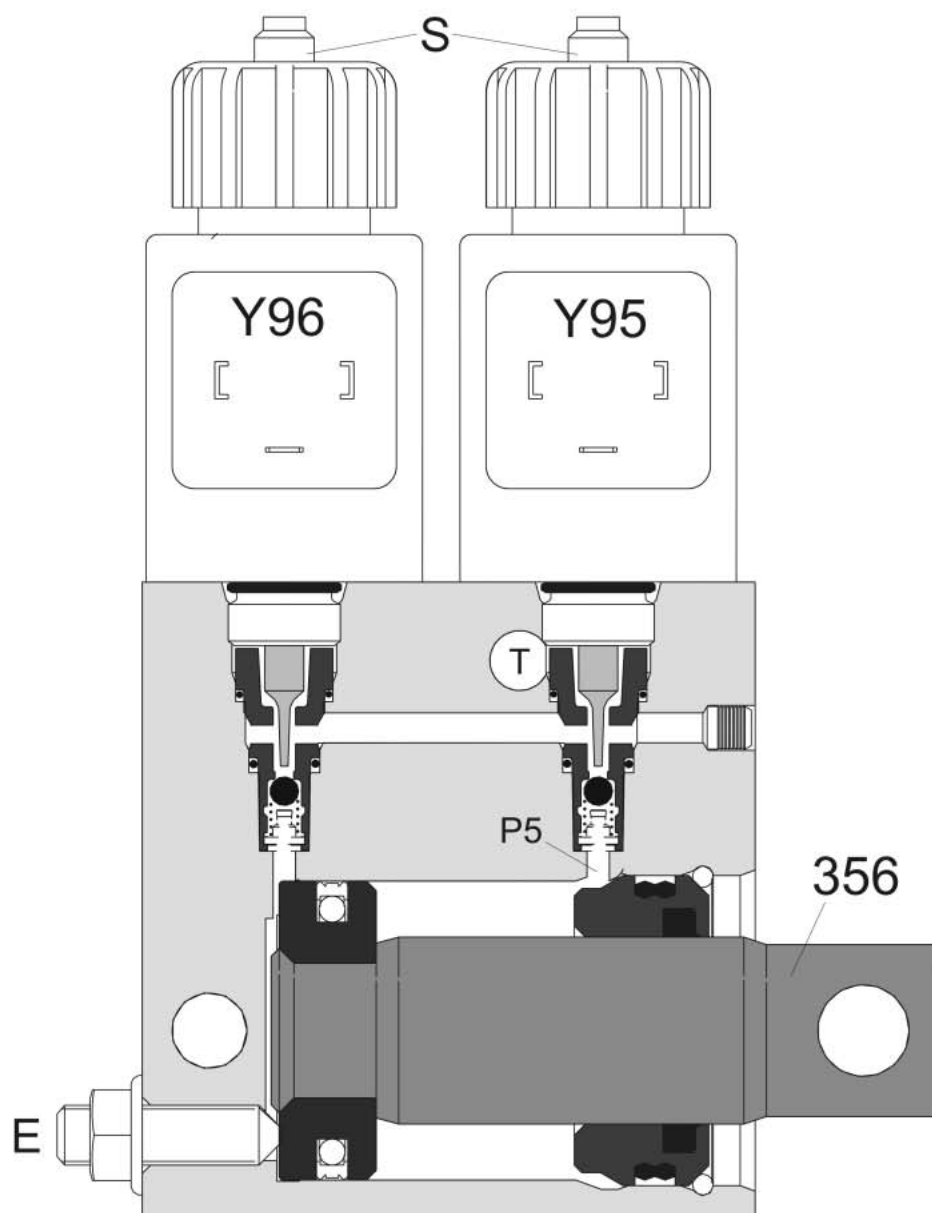
The bottom outlet valves (V) open every time an end position is reached so that air inclusions in the connection between the two rams can be flushed out.

After a repair, the cylinders must be flushed in both end positions for approx. 15 sec.

**Note:** On the folding cutterbar, this principle works just as well with three hydraulic cylinders equipped with bottom valves.

### 13.4 Reel Rpm Adjustment (Folding Cutterbar)

3/3 way valve



400544



**Key to diagram:**

212	Reel drive motor	
213	Reel drive pump .....	15 cm <sup>3</sup>
356	Reel drive control hydraulic cylinder	
406	Orifice plate .....	0.8 mm
424	Restrictor .....	0.6 mm
426	Restrictor .....	0.8 mm
443	Reel drive flush-out restrictor .....	0.9 mm
512	Reel drive accumulator	
706*	Pressure relief valve .....	159 <sup>+4</sup> bar
707	Pressure holding valve (non-return valve)	
744	Reel drive feed valve	
745	Reel drive feed pressure relief valve .....	(blocked)
811	Multi-coupling	
913	Reel drive high pressure forward measuring port	
914	Reel drive high pressure backward measuring port	
915	Reel drive feed pressure measuring port	
Y21	Threshing mechanism solenoid valve	
Y95	Reel rpm fast solenoid valve	
Y96	Reel rpm slow solenoid valve	
Y101	Front attachment quick stop solenoid coil	
E	Reel pump adjusting screw	
K	Reel drive control piston	
P5	Threshing mechanism hydraulic cylinder (low pressure) port	
S	Emergency operation screw	
T	Tank port	

\* The measurable pressure at the pressure relief valves (703) of the reel drive pump consists of the static setting of the valves (140 bar) and the low pressure (19<sup>+4</sup> bar)!

**Description of function:**

The hydraulic reel rpm control is realised using a variable displacement-type axial piston pump (213).

The axial piston pump (213) is adjusted only when a cutterbar or a maize picker with hydraulic down maize augers is engaged and activated. When operating without front attachment or with another front attachment, there is no axial piston pump adjustment, it remains in its basic position.

When the threshing mechanism is engaged, the system is supplied with oil by solenoid valve (Y21) (low-pressure hydraulics). The hydraulic cylinder (356) is controlled by the solenoid valves (Y95/Y96) and determines the swivel angle and therefore the volumetric delivery of pump (213). The reel module actuates the solenoid valves (Y95/Y96) in a modulated way.

After engaging the front attachment, the axial piston pump (213) is driven mechanically and delivers the required volume flow. The sense of rotation of the pump (forward or backward) depends on the sense of rotation of the front attachment.

To protect the system against overheating, an oil quantity is permanently flushed out via restrictor (443) in the return line circuit.

The pressure relief valves (706) safeguard the system at 160 bar (abs) in the respective high-pressure circuits.

If the reel runs on when the threshing mechanism is shut off (without oil supply), the accumulator (512) avoids running dry of the pump and the motor.

**Note:** After shutting off the front attachment, the reel rpm slow solenoid valve (Y96) is energized for another 4 seconds in order to fully retract the piston in the reel drive control hydraulic cylinder (356) (zero delivery by pump). The accumulator (512) additionally supports this process.

**Pump setting**

## - hydraulic

The basic setting of the axial piston pump (213) must be set to zero delivery by means of screw E.

- Engage front attachment
- Start the diesel engine
- Engage the threshing mechanism
- Front attachment ON
- Turn in screw S on the reel rpm slow solenoid valve (Y96) – the piston retracts – the pump moves to "zero delivery".
- Adjust reel rpm to zero by means of screw E
- Restore initial machine condition

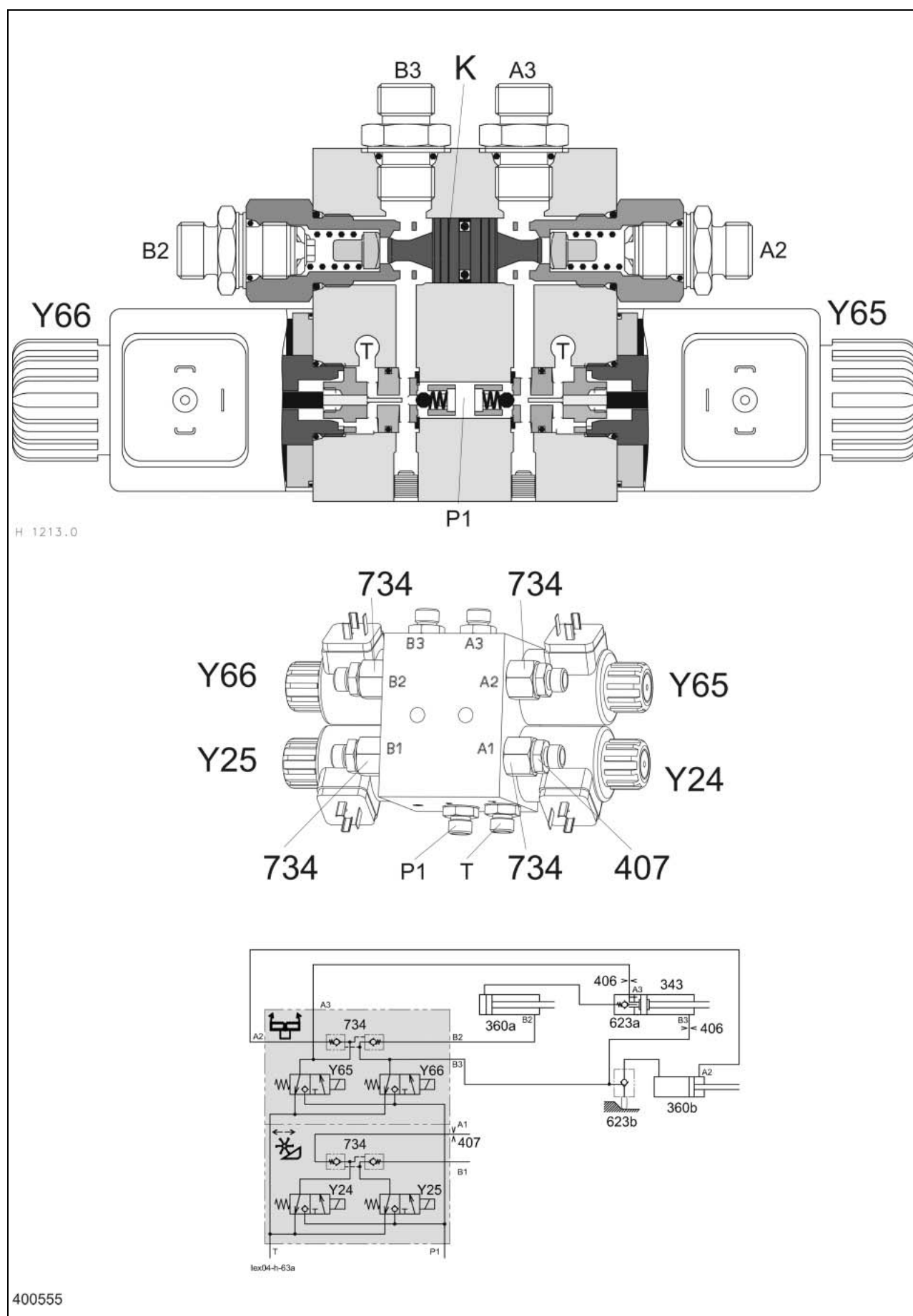
## - electric

In the basic position of the reel speed control variable-displacement pump sensor (B73), ensure that with the piston fully retracted (pump fully swivelled back), the signal voltage must be 0.5 V ( $\pm 0.1V$ ).

**Notes:**

**13.5 Folding the cutterbar**

4/3 way valve with lock-up valve unit



**Key to diagram:**

343	Cutterbar fold hydraulic cylinder
360(a)	Transport position lock hydraulic cylinder
360(b)	Working position lock hydraulic cylinder
406	Orifice plate .....Ø 0.8 mm
623(a)	Non-return valve (pilot-controlled)
623(b)	Non-return valve (pilot-controlled)
734	Non-return valve (Lock-up valve unit)
Y24	Reel forward solenoid valve
Y25	Reel reverse solenoid valve
Y65	Fold cutterbar to working position solenoid valve
Y66	Fold cutterbar to transport position solenoid valve
A2	Fold cutterbar port
B2	Fold cutterbar port
K	Piston
P1	Master valve / Working hydraulics pump port
P5	Threshing mechanism hydraulic cylinder (low pressure) port
T	Tank port

**Description of function:**

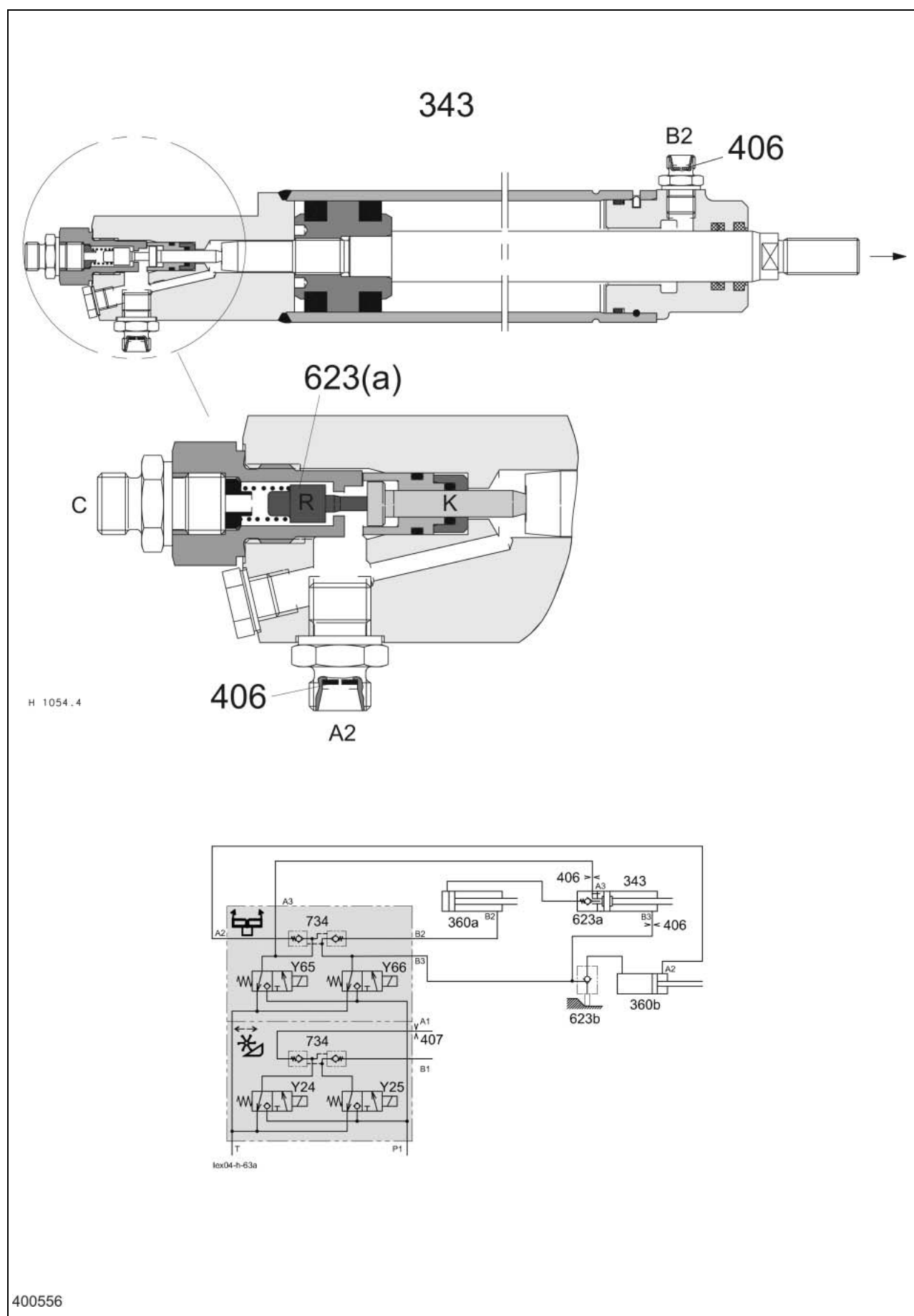
neutral

Both sides of the hydraulic cylinder are tightly closed by the non-return valves (734) in the consumer ports A and B.

Folding the cutterbar

Depending on the necessary direction of movement, one of the solenoid valves (Y65/Y66) and, at the same time, the master valve (Y77) is actuated. The corresponding pilot spool opens the ball in the valve insert and closes the return line to the tank. The pressure which consequently rises builds up against piston (K) and opens the non-return valve (734) at port A or B.

The return line of the hydraulic cylinder is thus released to the tank via the valve insert of the unactuated solenoid valve (Y65/Y66). The pressure rising further now opens the non-return valve (734) at the opposite port and the hydraulic cylinders are retracted or extended.

**Folding the cutterbar**  
Hydraulic cylinders

**Key to diagram:**

343	Cutterbar fold hydraulic cylinder
360(a)	Transport position lock hydraulic cylinder
360(b)	Working position lock hydraulic cylinder
406	Orifice plate ..... 0.8 mm
407	Orifice plate ..... 1.0 mm
623(a)	Non-return valve (pilot-controlled)
623(b)	Non-return valve (pilot-controlled)
734	Non-return valve (Lock-up valve unit)
Y22	Reel raise solenoid valve
Y23	Reel lower solenoid valve
Y24	Reel forward solenoid valve
Y25	Reel reverse solenoid valve
Y65	Fold cutterbar to working position solenoid valve
Y66	Fold cutterbar to transport position solenoid valve
A	Consumer port
B	Consumer port
K	Plunger
P1	Master valve / Working hydraulics pump port
R	Non-return valve
T	Tank port

**Description of function:**

With the connecting rod fully retracted, the non-return valve (R) is opened by the plunger (K). When the end stop is reached, the face end of the lock cylinder piston consequently is also relieved to the tank.





**14****Conspeed Maize  
Picker**

<b>14.1</b>	<b>Conspeed Maize Picker Circuit Diagram / 6-row .....</b>	<b>14-4</b>
<b>14.2</b>	<b>Conspeed Maize Picker Circuit Diagram / 8-row .....</b>	<b>14-8</b>
<b>14.3</b>	<b>Folding the Snapping Units / Adjusting the Snapping Plates – Conspeed Maize Picker ....</b>	<b>14-10</b>
	4/3 way valve .....	14-10
	Folding sheet metal cover shut-off valve .....	14-12

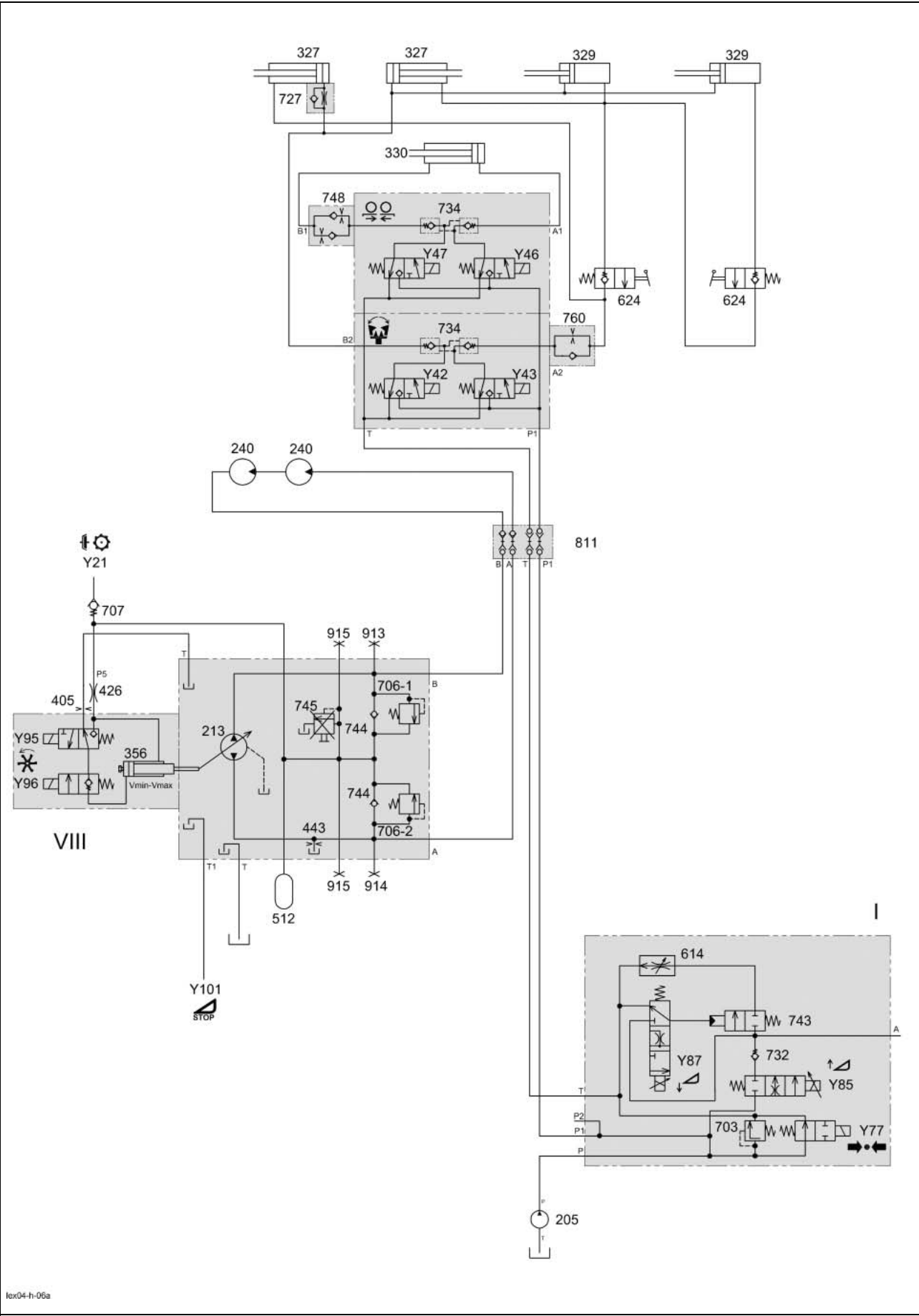


## **14.1**

### **Conspeed Maize Picker Circuit Diagram**

6-row

14.1    Conspeed Maize Picker Circuit Diagram / 6-row



- Key to diagram:
- 205

213

240

327

329

330

356

405

426

443

512

614

624

703

706

707

727

732

734

743

744

745

748

760

811

913

914

915

Y21

Y42

Y43

Y46

Y47

Y77

Y85

Y87

Y95

Y96

Y101

A

B

P

P1

P5

T

Working hydraulics pump

Reel drive pump.....15 cm<sup>3</sup>

Down maize auger motor

Maize picker fold hydraulic cylinder

Fold maize picker sheet metal covers hydraulic cylinder

Snapping plate adjustment hydraulic cylinder

Reel drive control variable displacement pump hydraulic cylinder

Orifice plate.....0.6 mm

Restrictor .....0.8 mm

Reel drive flush-out restrictor.....0.9 mm

Reel drive accumulator

Flow control valve .....5 - 50 l/min

Folding sheet metal cover shut-off valve

Pressure relief valve .....175<sup>+15</sup> bar

Pressure relief valve .....140 bar

Pressure holding valve (non-return valve)

Return flow restrictor .....Ø 1.5+4x2 mm

Non-return valve (inlet valve)

Non-return valve (Lock-up valve unit)

Lower front attachment pilot valve

Reel drive feed valve

Reel drive feed pressure relief valve .....(blocked)

One-way restrictor valve

One-way restrictor, one-sided

Multi-coupling

Reel drive high pressure forward measuring port

Reel drive high pressure backward measuring port

Reel drive feed pressure measuring port

Threshing mechanism solenoid valve

Fold out maize picker solenoid valve (working position)

Fold in maize picker solenoid valve (transport position)

Snapping plates narrow solenoid valve (close)

Snapping plates wide solenoid valve (open)

Master valve solenoid valve

Raise front attachment solenoid valve

Lower front attachment solenoid valve

Reel rpm fast solenoid valve

Reel rpm slow solenoid valve

Front attachment quick stop solenoid coil

Consumer port

Consumer port

Working hydraulics pump port

Master valve / Working hydraulics pump port

Threshing mechanism hydraulic cylinder (low pressure) port

Tank port

**Description of function:**

## Fold maize picker

When folding the maize picker to transport position, the hydraulic cylinders (329) first lift the sheet metal covers at the separating points until the system pressure rises so that the hydraulic cylinders (327) raise the side elements. When folding to working position, the sheet metal covers at the separating points can only be lowered after the shut-off valves (624) are mechanically opened by the folded-out side elements.

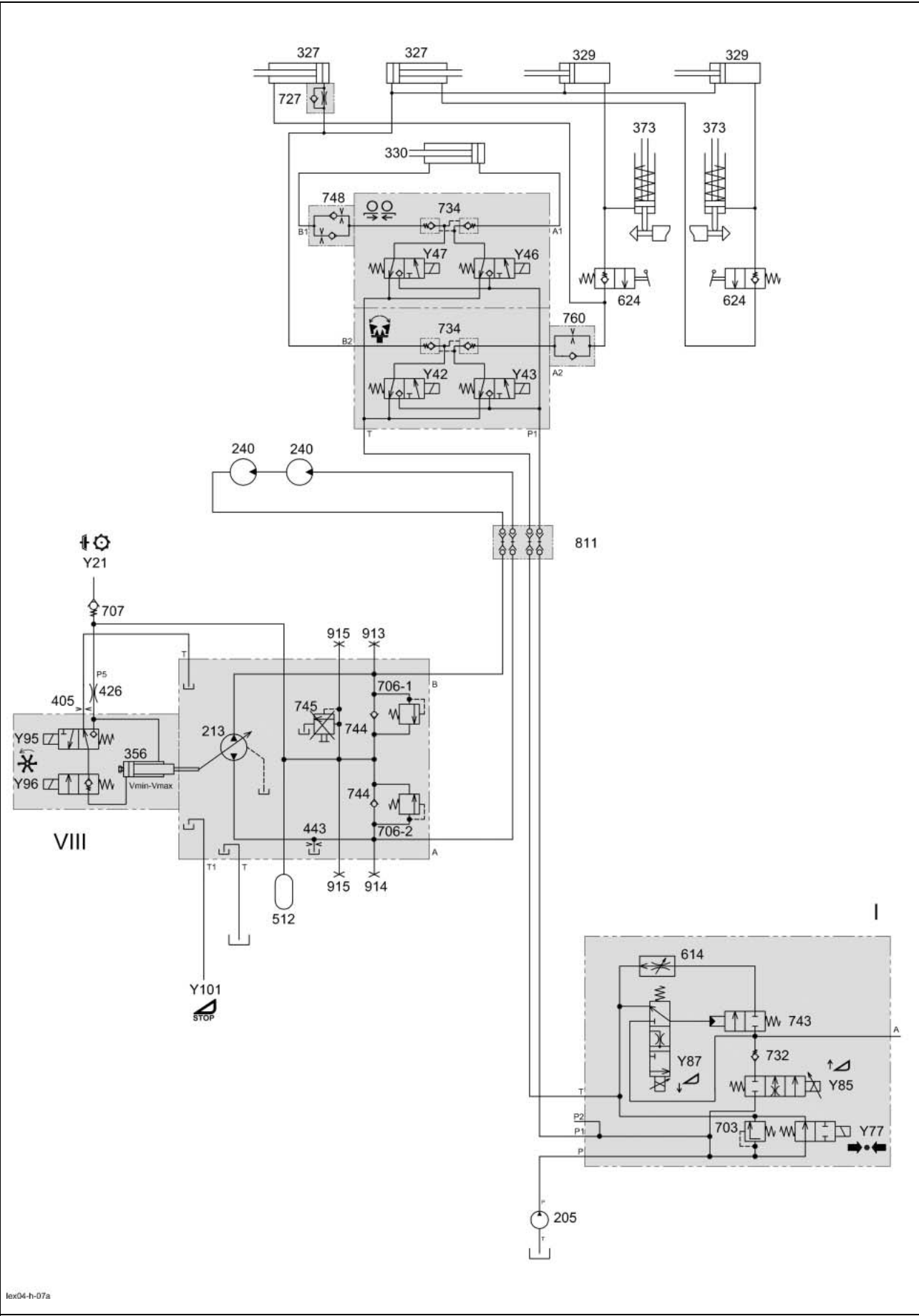


## **14.2**

### **Conspeed Maize Picker Circuit Diagram**

8-row

14.2    Conspeed Maize Picker Circuit Diagram / 8-row



- Key to diagram:
- |      |  |
|------|--|
| 205  | Working hydraulics pump  |
| 213  | Reel drive pump..... 15 cm <sup>3</sup>                          |
| 240  | Down maize auger motor   |
| 327  | Maize picker fold hydraulic cylinder                             |
| 329  | Fold maize picker sheet metal covers hydraulic cylinder          |
| 330  | Snapping plate adjustment hydraulic cylinder                     |
| 356  | Reel drive control variable displacement pump hydraulic cylinder |
| 373  | Snapping plate lock hydraulic cylinder                           |
| 405  | Orifice plate..... 0.6 mm  |
| 426  | Restrictor ..... 0.8 mm  |
| 443  | Reel drive flush-out restrictor..... 0.9 mm                      |
| 512  | Reel drive accumulator   |
| 614  | Flow control valve ..... 5 - 50 l/min                            |
| 624  | Folding sheet metal cover shut-off valve                         |
| 703  | Pressure relief valve ..... 175 <sup>+15</sup> bar               |
| 706  | Pressure relief valve ..... 140 bar                              |
| 707  | Pressure holding valve (non-return valve)                        |
| 727  | Return flow restrictor ..... Ø 1.5+4x2 mm                        |
| 732  | Non-return valve (inlet valve)                                   |
| 734  | Non-return valve (Lock-up valve unit)                            |
| 743  | Lower front attachment pilot valve                               |
| 744  | Reel drive feed valve  |
| 745  | Reel drive feed pressure relief valve ..... (blocked)            |
| 748  | One-way restrictor valve   |
| 760  | One-way restrictor, one-sided                                    |
| 811  | Multi-coupling   |
| 913  | Reel drive high pressure forward measuring port                  |
| 914  | Reel drive high pressure backward measuring port                 |
| 915  | Reel drive feed pressure measuring port                          |
| Y21  | Threshing mechanism solenoid valve                               |
| Y42  | Fold out maize picker solenoid valve (working position)          |
| Y43  | Fold in maize picker solenoid valve (transport position)         |
| Y46  | Snapping plates narrow solenoid valve (close)                    |
| Y47  | Snapping plates wide solenoid valve (open)                       |
| Y77  | Master valve solenoid valve                                      |
| Y85  | Raise front attachment solenoid valve                            |
| Y87  | Lower front attachment solenoid valve                            |
| Y95  | Reel rpm fast solenoid valve                                     |
| Y96  | Reel rpm slow solenoid valve                                     |
| Y101 | Front attachment quick stop solenoid coil                        |
| A    | Consumer port  |
| B    | Consumer port  |
| P    | Working hydraulics pump port                                     |
| P1   | Master valve / Working hydraulics pump port                      |
| P5   | Threshing mechanism hydraulic cylinder (low pressure) port       |
| T    | Tank port  |



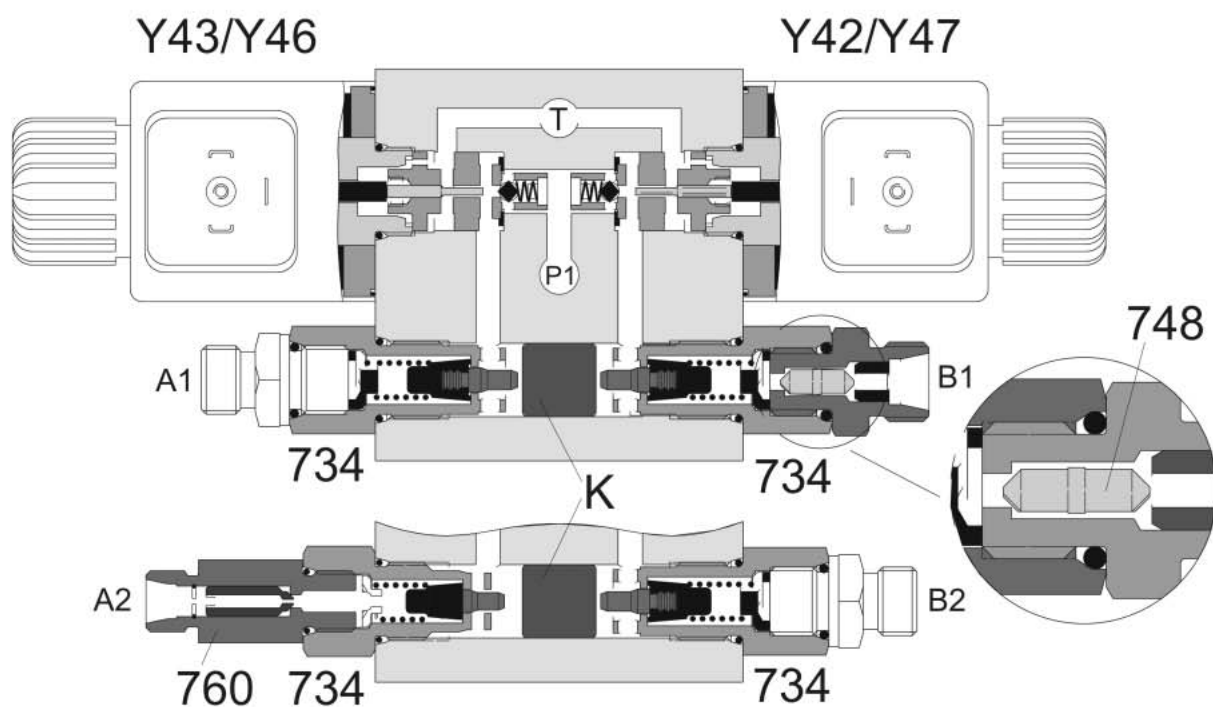
**Description of function:****Fold maize picker**

When folding the maize picker to transport position, the hydraulic cylinders (329) first lift the sheet metal covers at the separating points until the system pressure rises so that the hydraulic cylinders (327) raise the side elements. When folding to working position, the sheet metal covers at the separating points can only be lowered after the shut-off valves (624) are mechanically opened by the folded-out side elements.

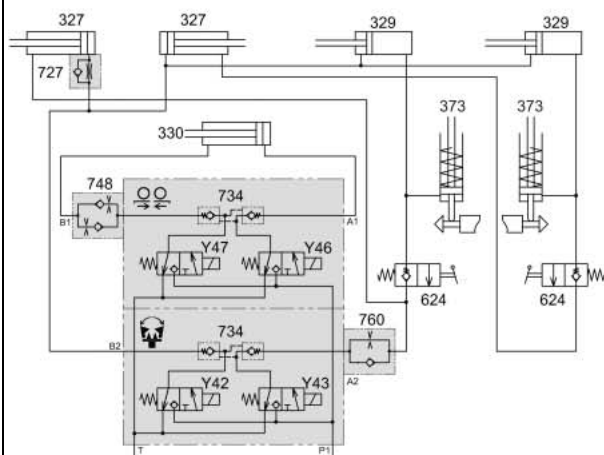
In working position, the side elements of the 8-row maize picker are provided with an additional mechanical lock. In this process, the tapered peg pushes the lock against the spring in the hydraulic cylinder (373) until the spring engages in the groove located behind it. When folding to transport position, the hydraulic cylinders (373) are actuated in parallel and thus unlock the pegs on the side elements.

The return flow restrictor (727) provided on the 8-row maize picker avoids a collision of the side elements during folding to transport position.

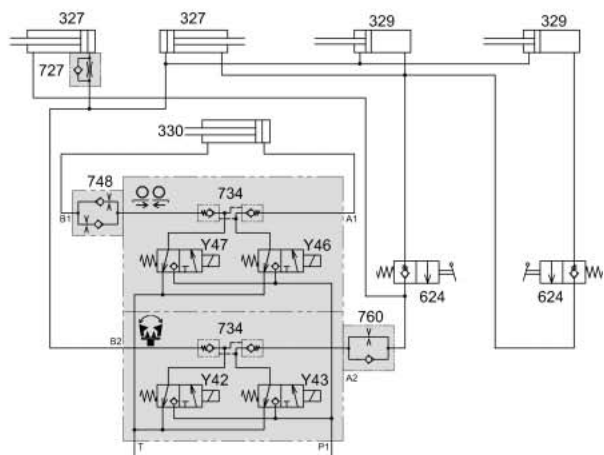
### 14.3 Folding the Snapping Units / Adjusting the Snapping Plates – Conspeed Maize Picker 4/3 way valve



H 1059.4



lex04-h-64a



lex04-h-65a

400558

**Key to diagram:**

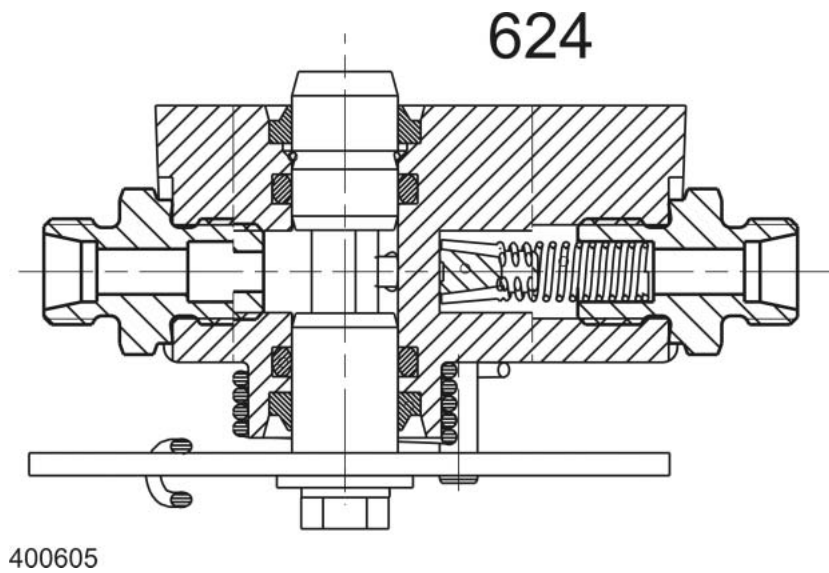
327	Maize picker fold hydraulic cylinder
329	Fold maize picker sheet metal covers hydraulic cylinder
330	Snapping plate adjustment hydraulic cylinder
373	Snapping plate lock hydraulic cylinder
624	Folding sheet metal cover shut-off valve
727	Return flow restrictor .....Ø 1.5+4x2 mm
734	Non-return valve (Lock-up valve unit)
748	One-way restrictor valve
760	One-way restrictor, one-sided
Y42	Fold out maize picker solenoid valve (working position)
Y43	Fold in maize picker solenoid valve (transport position)
Y46	Snapping plates narrow solenoid valve (close)
Y47	Snapping plates wide solenoid valve (open)
A	Consumer port
B	Consumer port
P1	Master valve / Working hydraulics pump port
T	Tank port
K	Piston

**Description of function:****Neutral**

Both sides of the hydraulic cylinder are tightly closed by the non-return valves (734) in the consumer ports A and B.

**Folding the snapping units /  
Adjusting the snapping  
plates**

Depending on the necessary direction of movement, one of the solenoid valves (Y43/Y42 - Y46/Y47) and the master valve (Y77) are actuated. The corresponding pilot spool opens the ball in the valve insert and closes the return line to the tank. The pressure which consequently rises builds up against piston (K) and opens the non-return valve (734) at port A or B. The return line of the hydraulic cylinder is thus released to the tank via the valve insert of the unactuated solenoid valve (Y43/Y42 - Y46/Y47). The pressure rising further now opens the non-return valve (734) at the opposite port and the hydraulic cylinders are retracted or extended.

**Folding the Snapping Units / Adjusting the Snapping Plates - Conspeed Maize Picker**  
Folding sheet metal cover shut-off valve

**Key to diagram:**

624 Folding sheet metal cover shut-off valve

**Description of function:****Fold maize picker**

When folding the maize picker to transport position, the hydraulic cylinders (329) first lift the sheet metal covers at the separating points until the system pressure rises so that the hydraulic cylinders (327) raise the side elements. When folding to working position, the sheet metal covers at the separating points can only be lowered after the shut-off valves (624) are mechanically opened by the folded-out side elements.

In working position, the side elements of the 8-row maize picker are provided with an additional mechanical lock. In this process, the tapered peg pushes the lock against the spring in the hydraulic cylinder (373) until the spring engages in the groove located behind it. When folding to transport position, the hydraulic cylinders (373) are actuated in parallel and thus unlock the pegs on the side elements.

The return flow restrictor (727) avoids a collision of the side elements during folding to transport position.

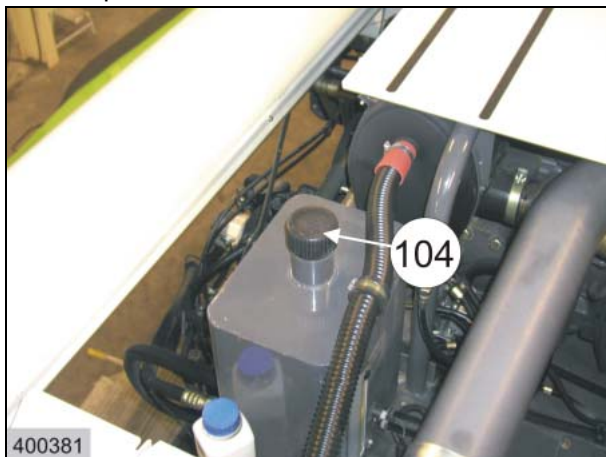


## **Position of components**

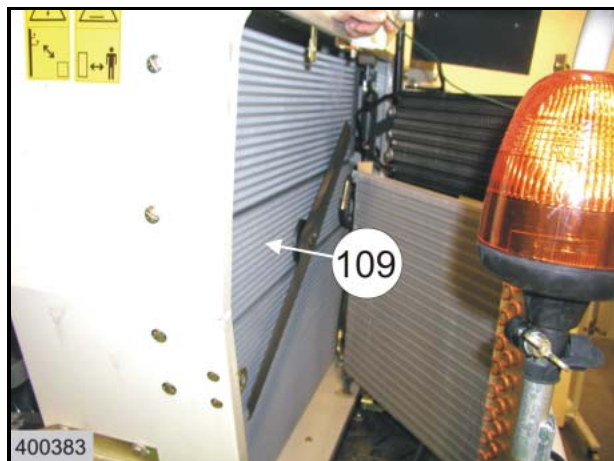
102 – 3 p 20



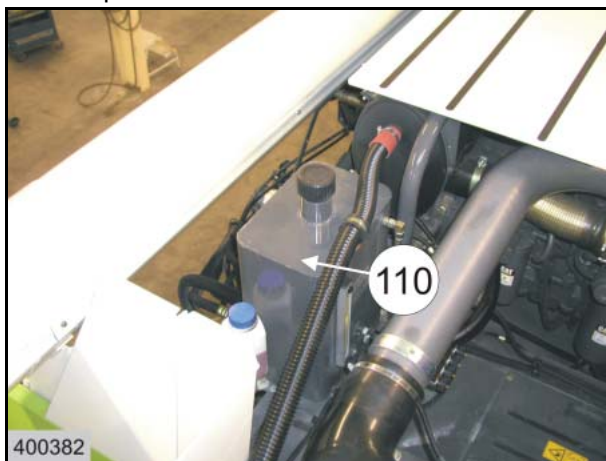
104 – 3 p 20



109 – 3 t 16



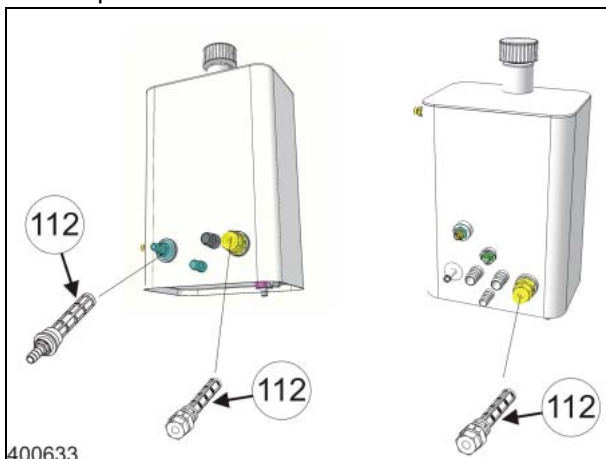
110 – 3 p 20



111 – 8 f 25



112 - 3 p 20





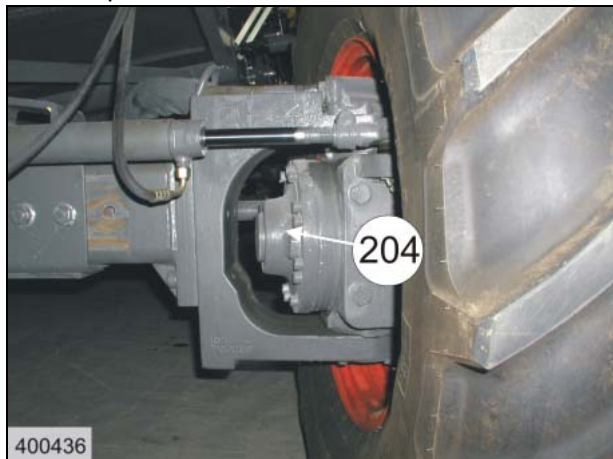
115 - 3 p 20



203 - 8 q 20



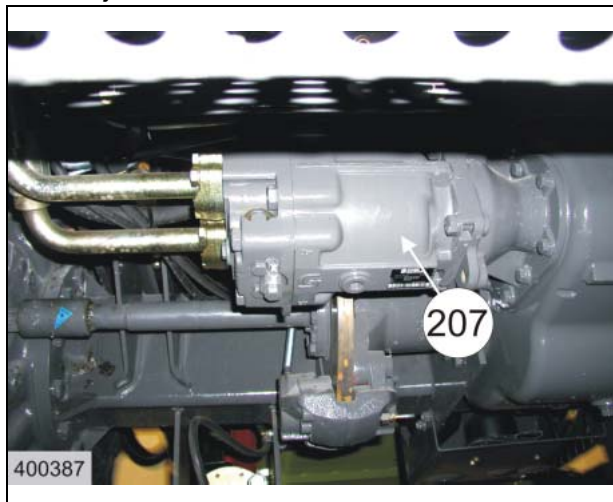
204 - 8 q 16



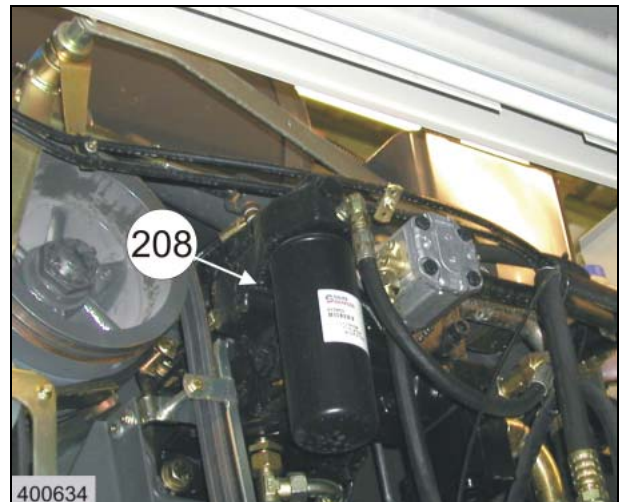
205 - 3 o 20



207 - 7 j 20



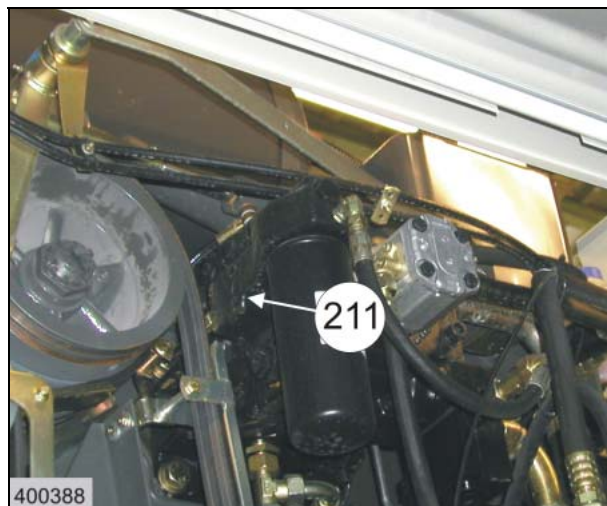
208 - 3 o 20



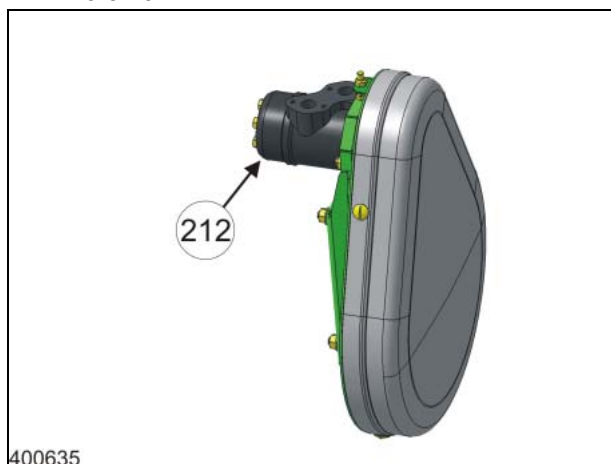
209 – 3 o 20



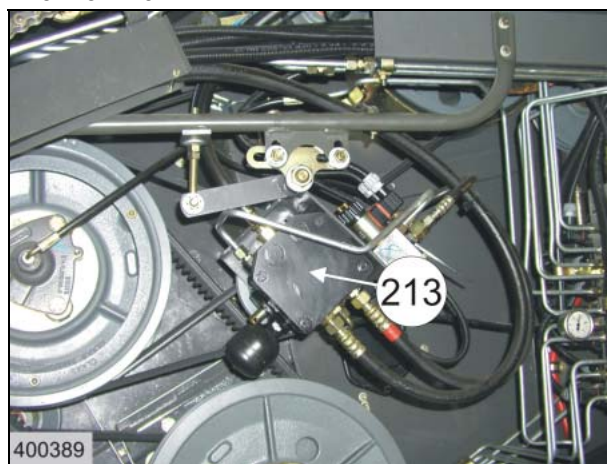
211 – 3 o 20



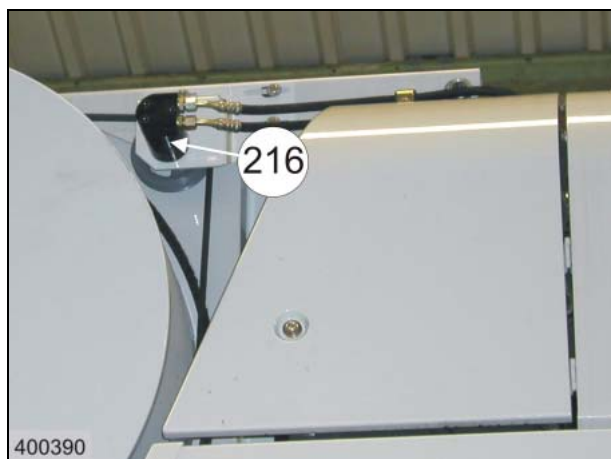
212 – 6 c 10



213 – 5 k 19



216 – 2 o 15



217 – 3 o 19

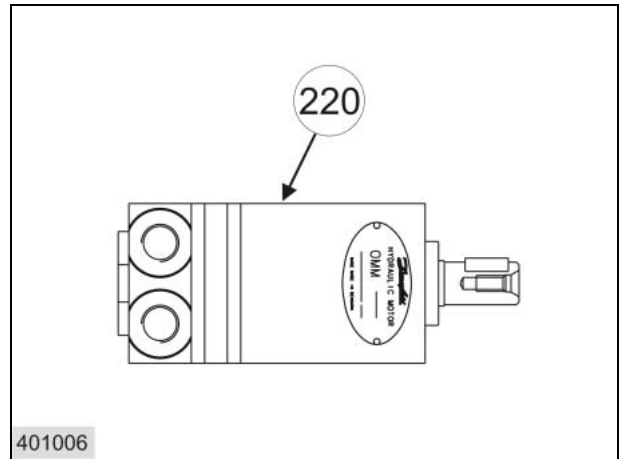




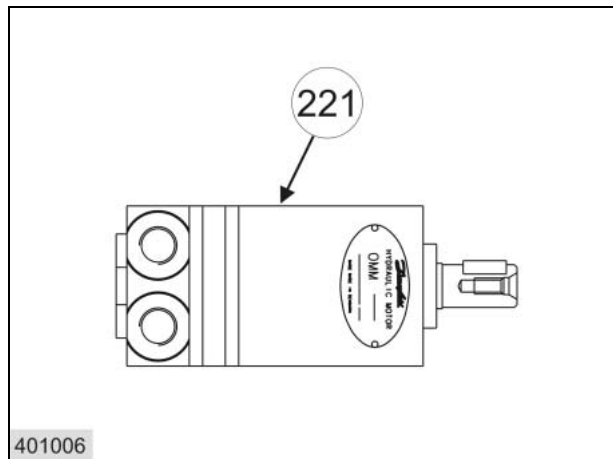
218 – 3 o 20



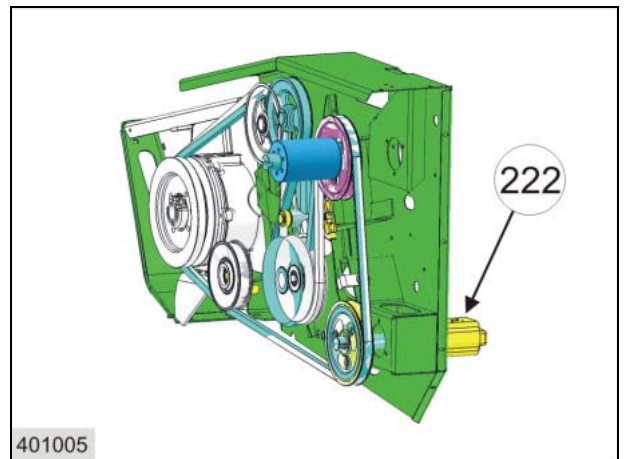
220 – 6 c 26



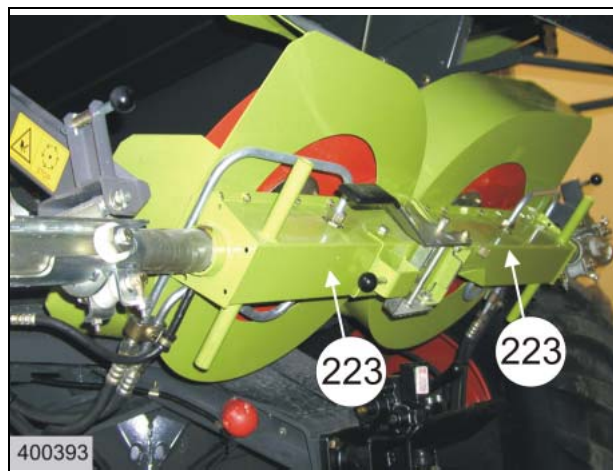
221 - 6 c 10



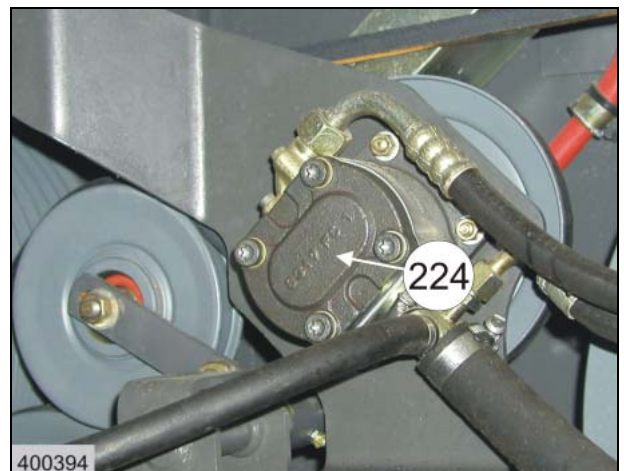
222 – 8 e 25



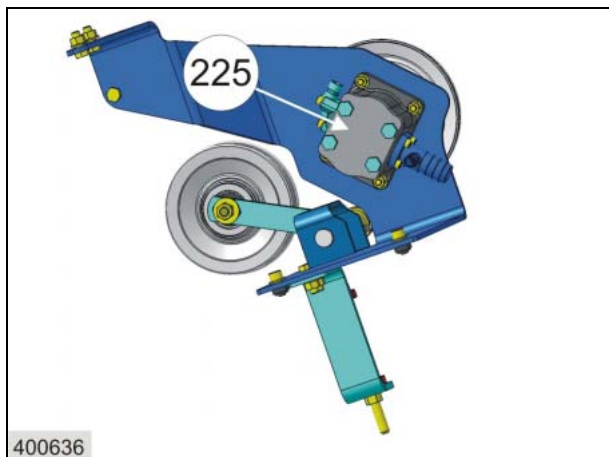
223 – 7 s 19



224 – 5 l 19



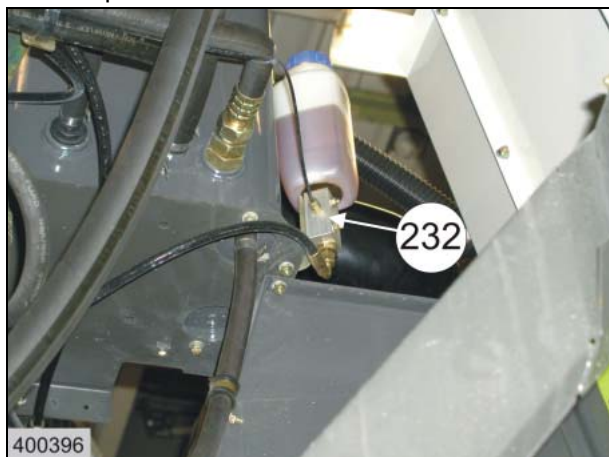
225 – 5 | 19



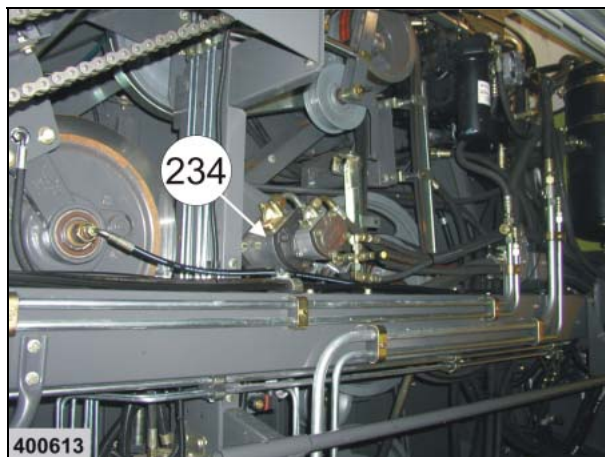
226 – 7 e | 17



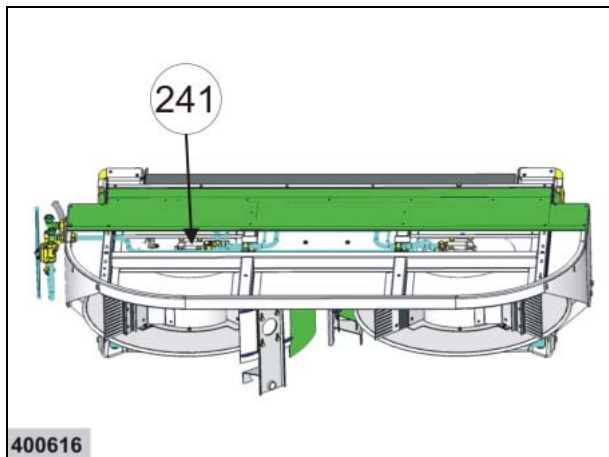
232 – 3 p | 19



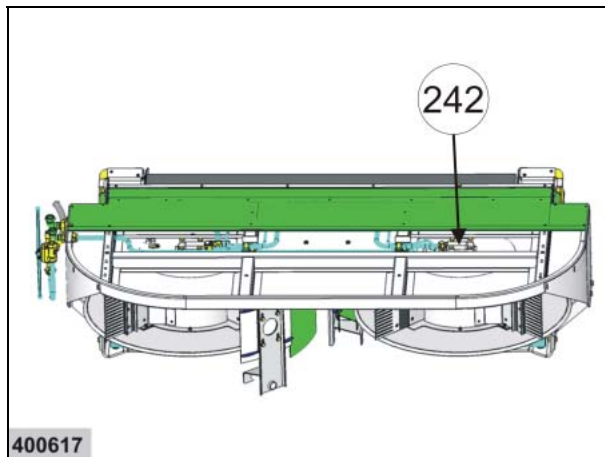
234 - 5 | 19



241 – 7 u | 19

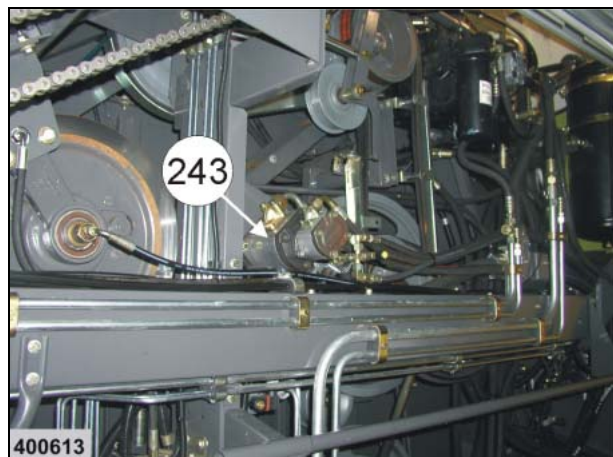


242 – 7 u | 17

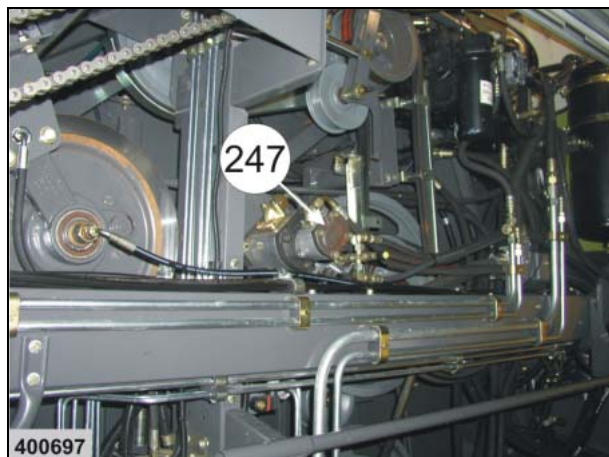




243 - 5 l 19



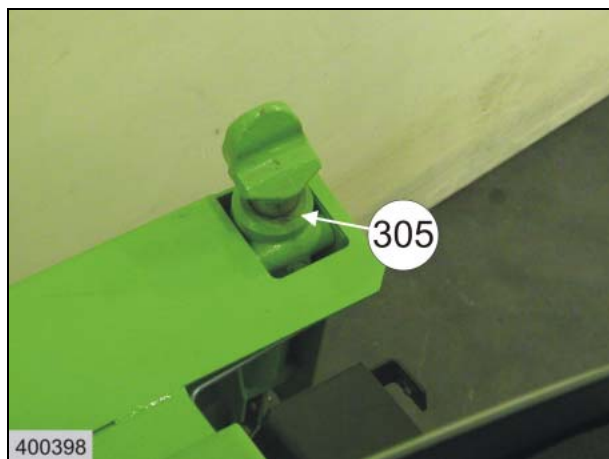
247 - 5 l 19



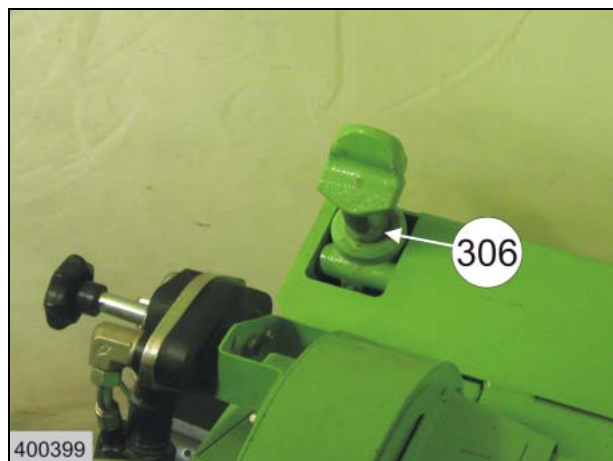
301 - 7 o 16



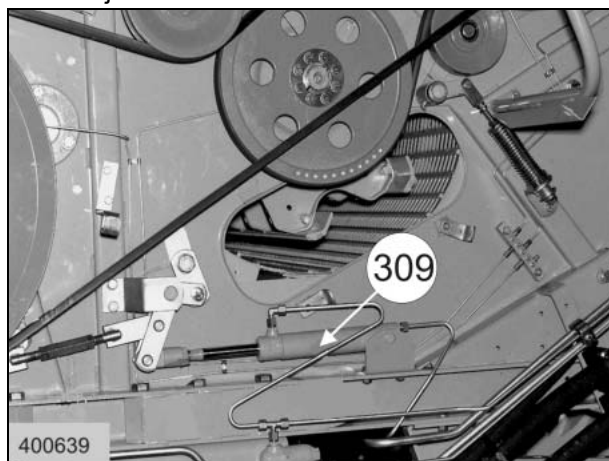
305 - 7 e 19



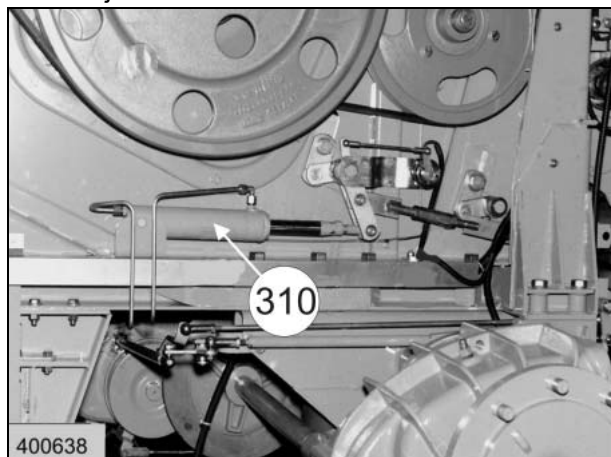
306 - 7 e 17



309 - 6 j 19



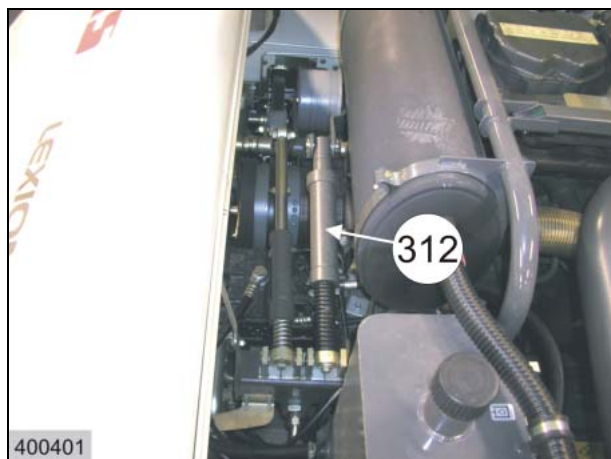
310 – 6 j 16



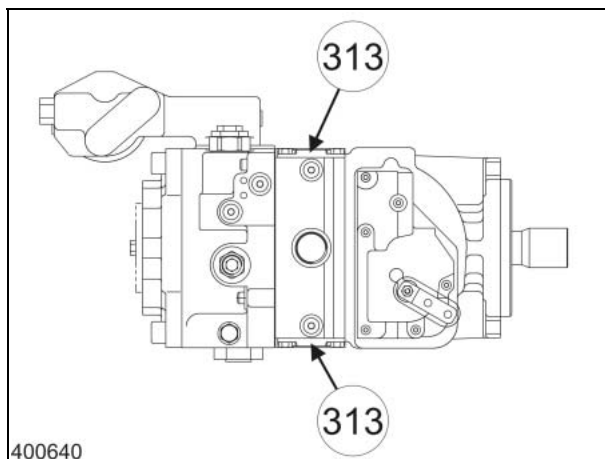
311 – 5 k 19



312 – 4 o 20



313 – 3 o 20



314 – 7 d 26



315 – 7 d 10

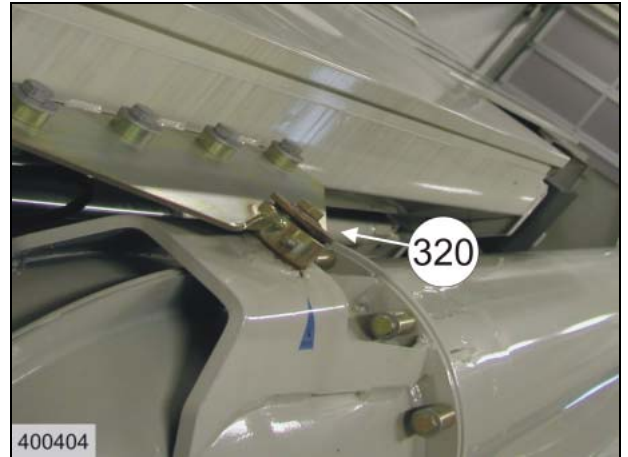




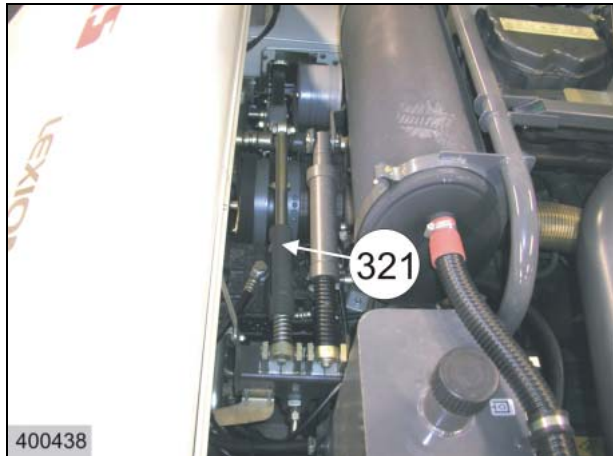
316 – 6 c 26



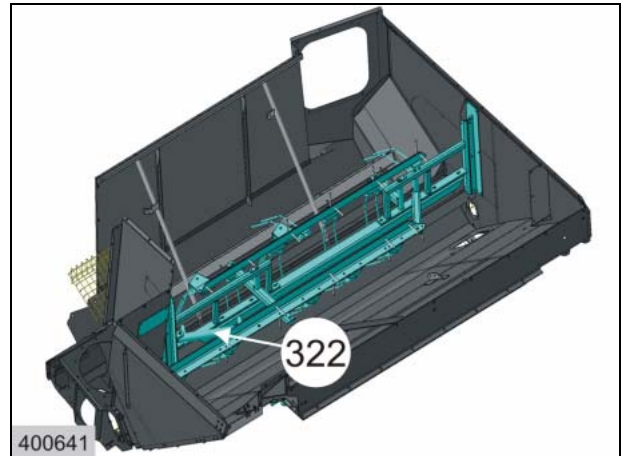
320 – 2 m 21



321 - 4 o 20



322 – 4 k 19



323 – 8 q 20



323 - 8 q 16



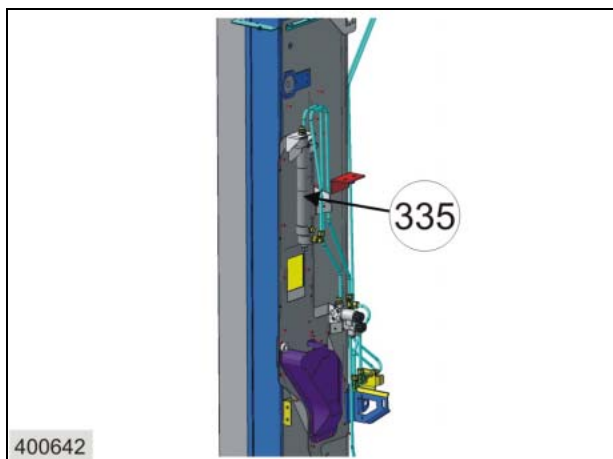
327 – 7 e 20 (16)



329 - 8 c 22



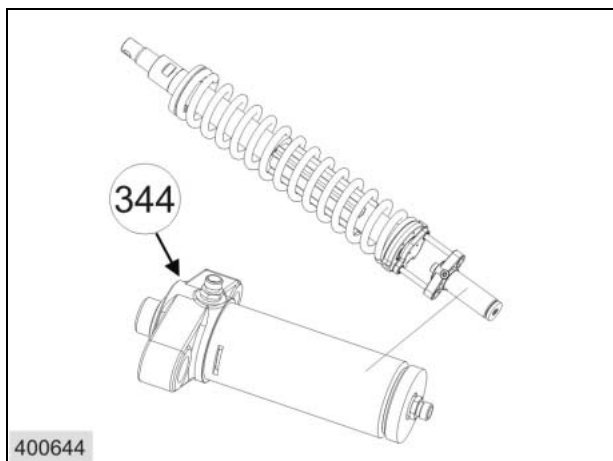
335 – 5 m 16



343 – 7 e 17



344 – 7 i 20



347 - 4 o 20





348 – 5 u 20



349 – 8 e 11



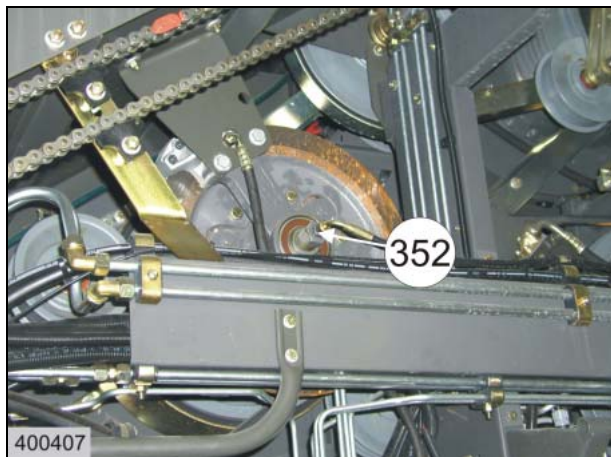
350 – 6 u 18



351 – 8 g 19



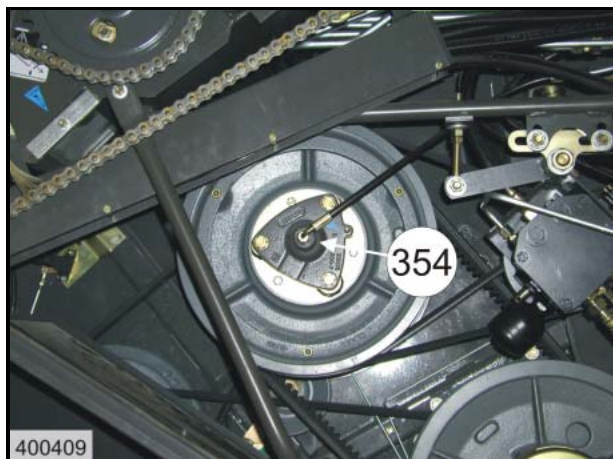
352 - 5 k 19



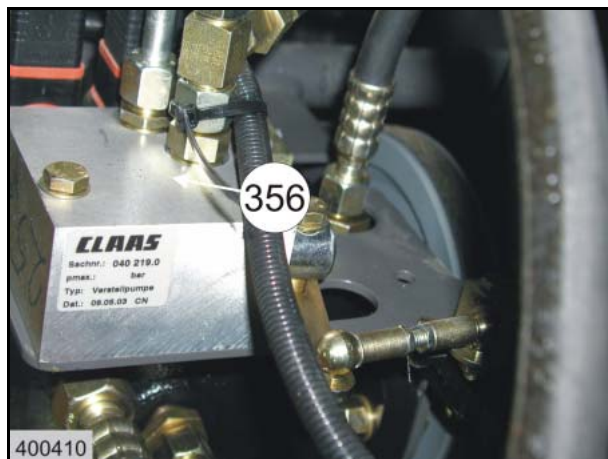
353 – 7 f 17



354 – 5 l 20



356 – 5 l 20



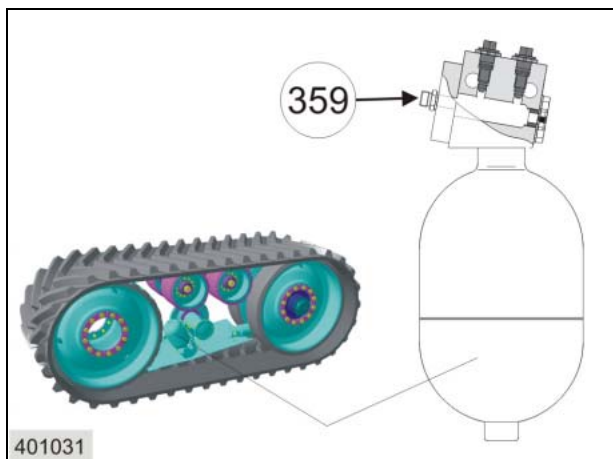
357 – 4 s 17



358 – 5 m 16



359 – 7 i 21



378 – 5 u 20

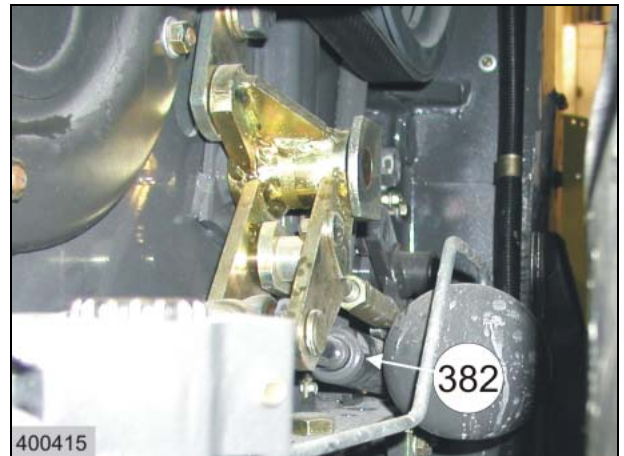




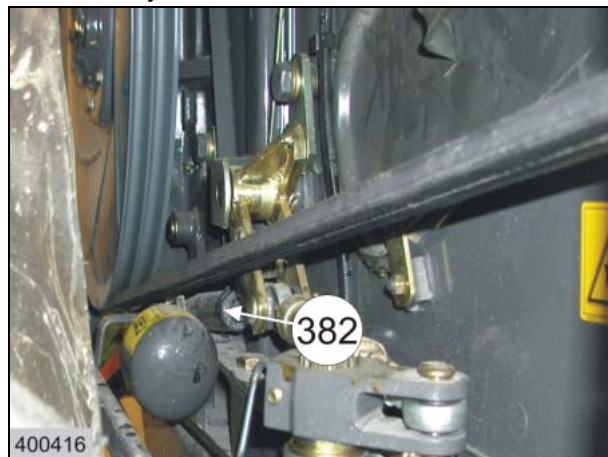
381 – 6 k 16



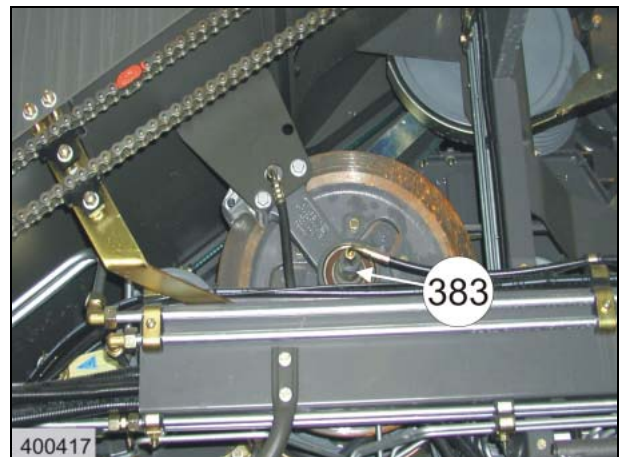
382 right – 6 j 16



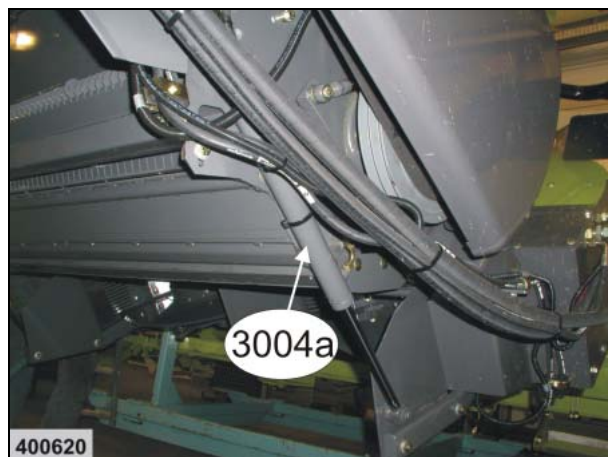
382 left – 6 j 19



383 – 5 k 19



3004a - 16 t 20



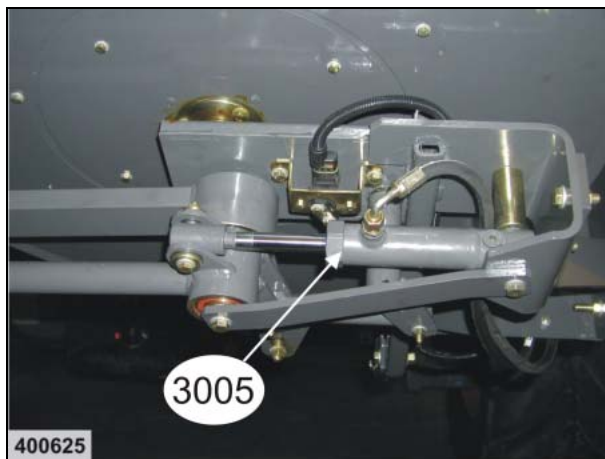
3004b – 5 t 20



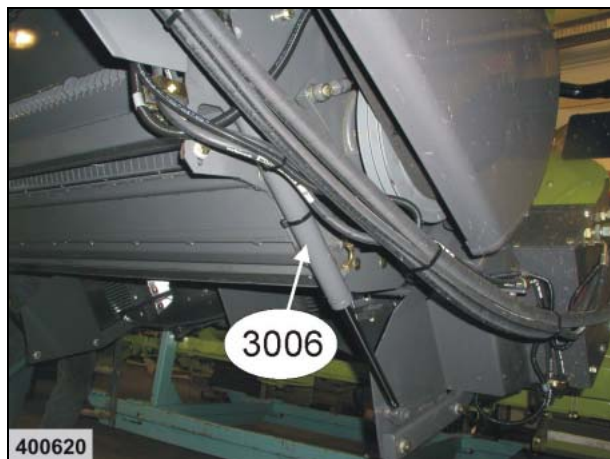
3005 - 7 u 19



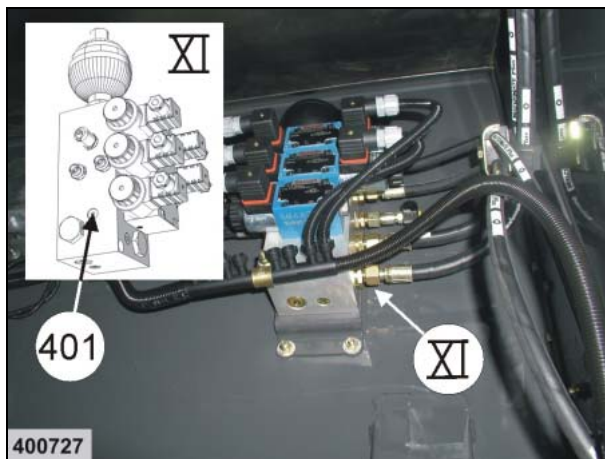
3005 - 7 t 19



3006 - 16 t 20



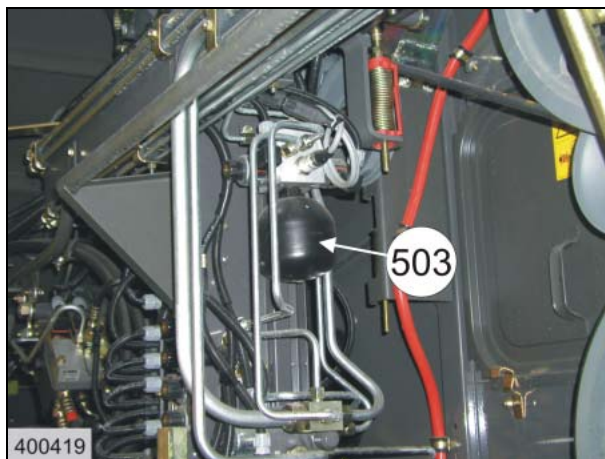
401 - 4 s 18



502 - 7 f 17

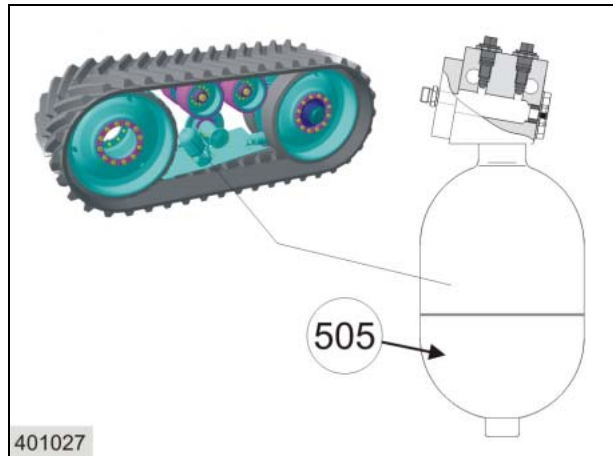


503 - 5 m 20





505 – 7 i 218



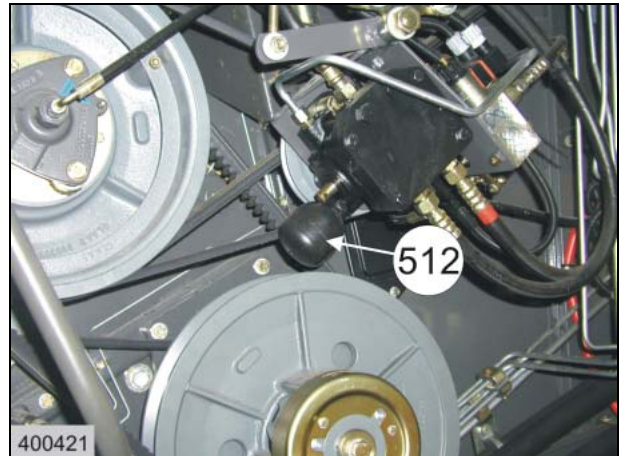
507 – 5 u 20



508 – 7 i 18



512 – 5 i 19



515 – 4 p 19



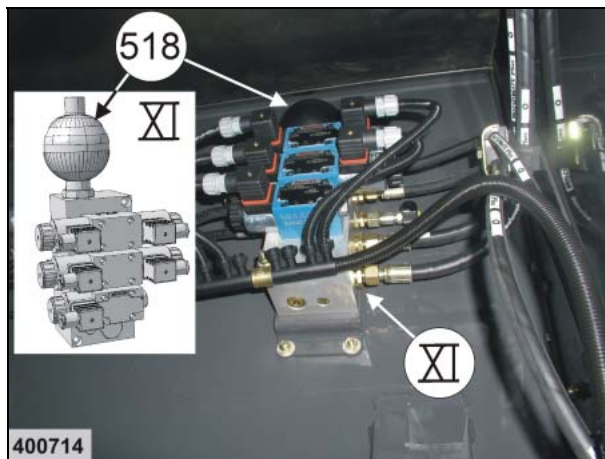
515 – 5 t 20



517 – 5 t 20



518 - 4 s 18



601 – 6 p 16



602 – 8 f 19



603 – 7 f 17



604 – 5 m 19

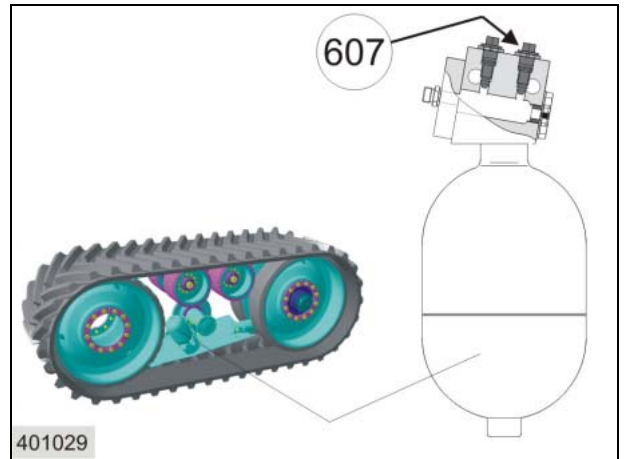




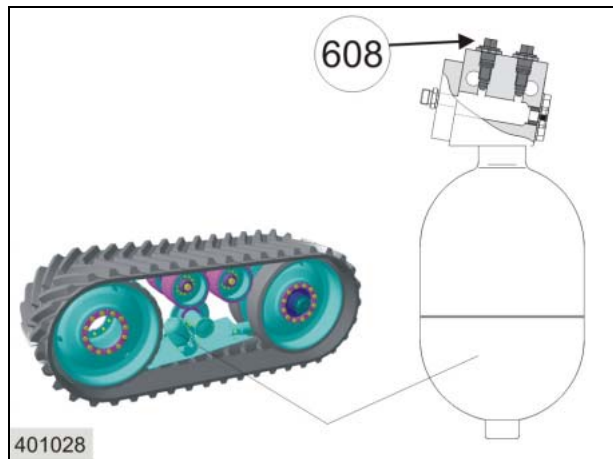
606 – 4 p 19



607 – 7 i 21



608 – 7 i 218



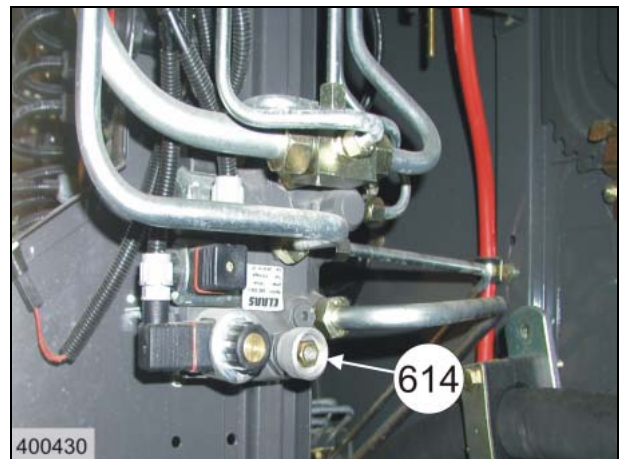
609 – 5 g 18



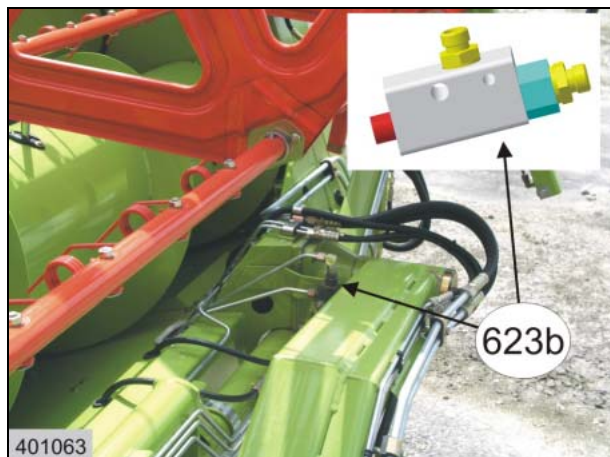
611 – 5 r 20



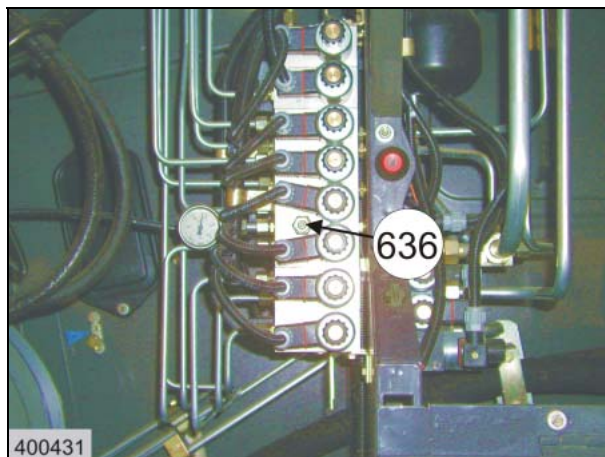
614 – 5 m 19



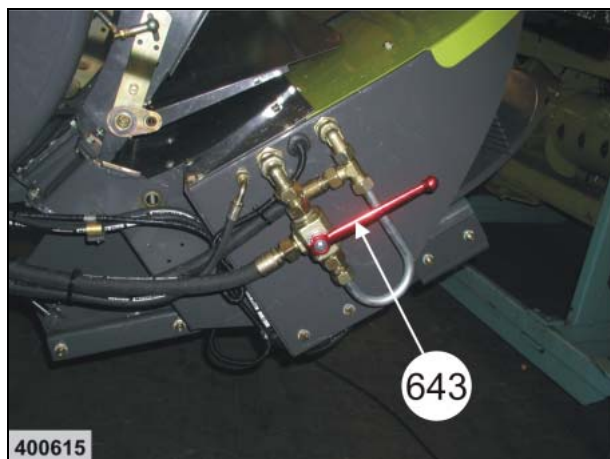
623b – 7 e 15



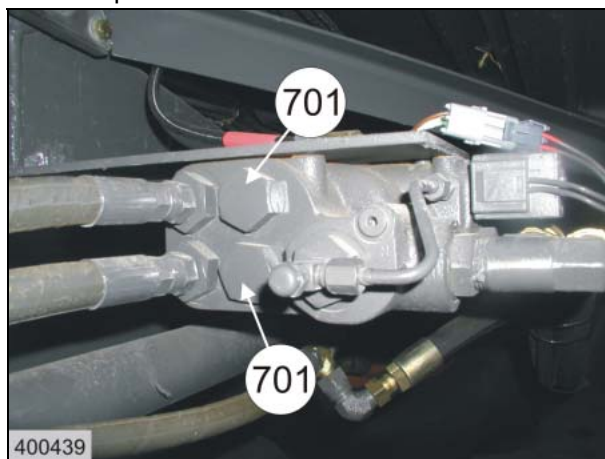
636 – 5 m 19



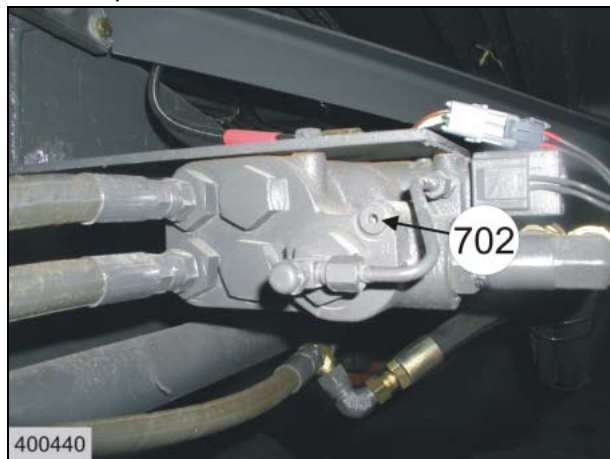
643 – 7 u 20



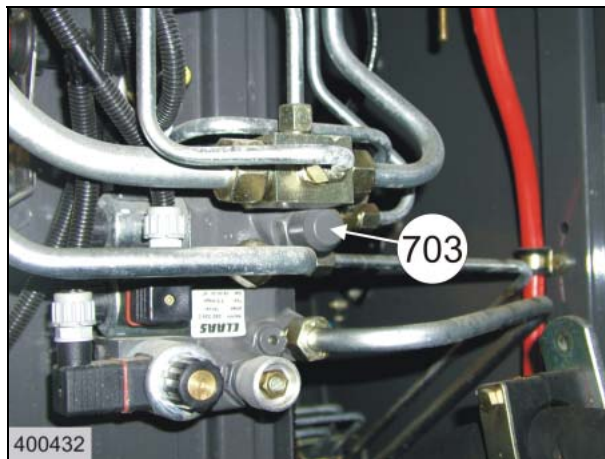
701 – 8 q 18



702 – 8 q 18

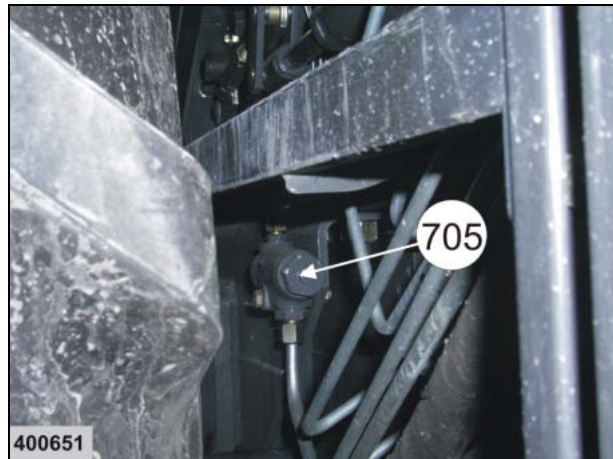


703 – 5 m 19

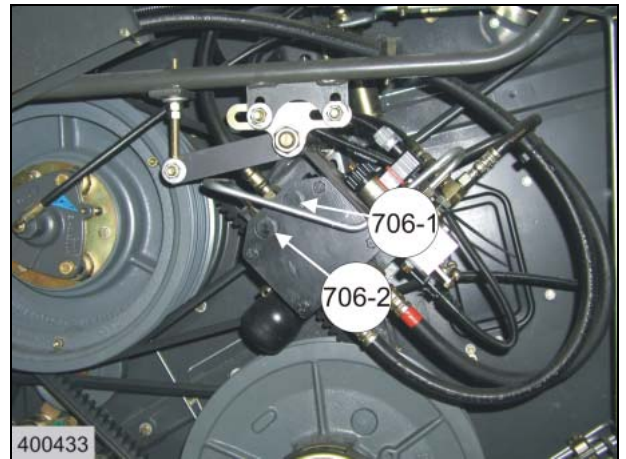




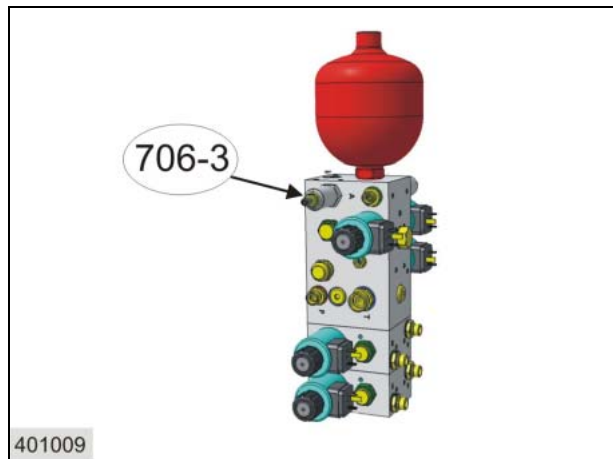
705 – 6 k 20



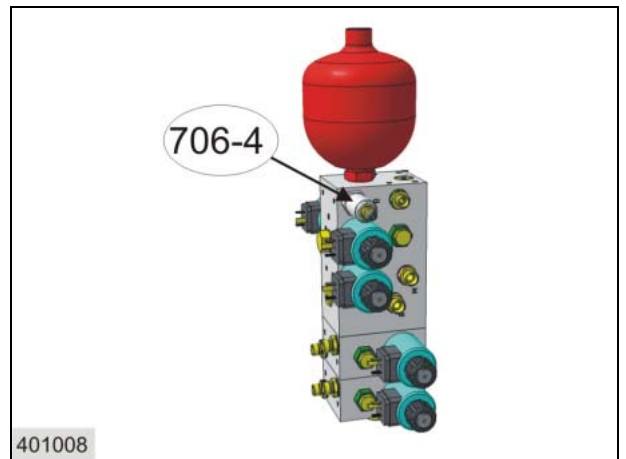
706-1 – 5 l 19



706-3 – 7 f 17



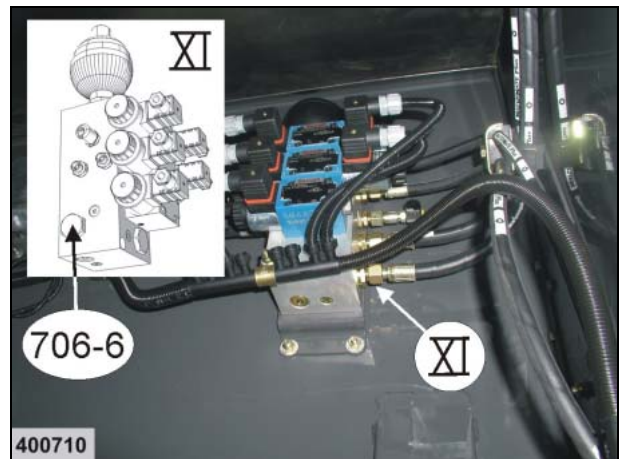
706-4 – 7 f 17



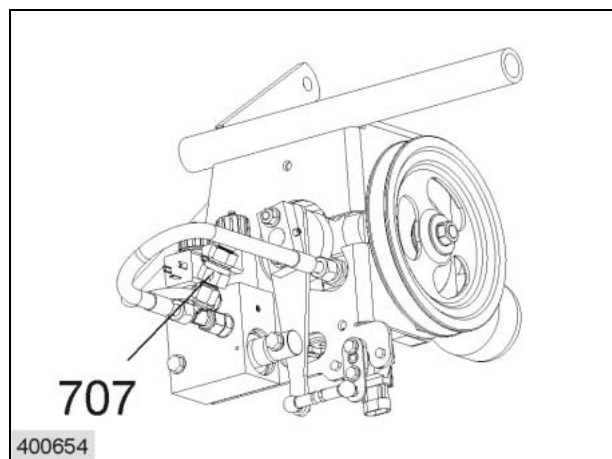
706-5 – 2 o 20



706-6 – 4 s 18



707 – 5 l 19



708 – 3 o 19



709 – 3 o 19



710 – 3 o 19



711 – 3 o 19

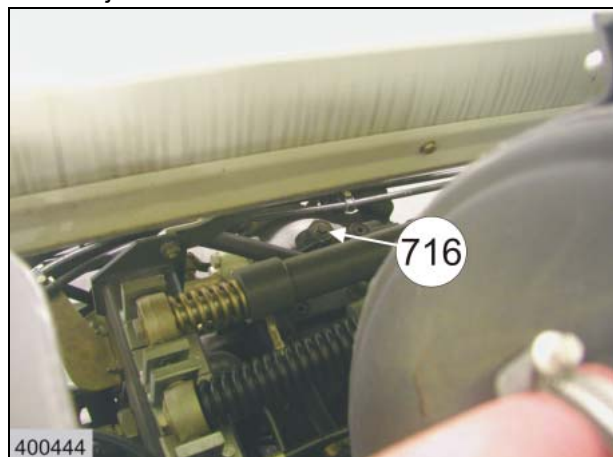


713, 714 – 3 o 19

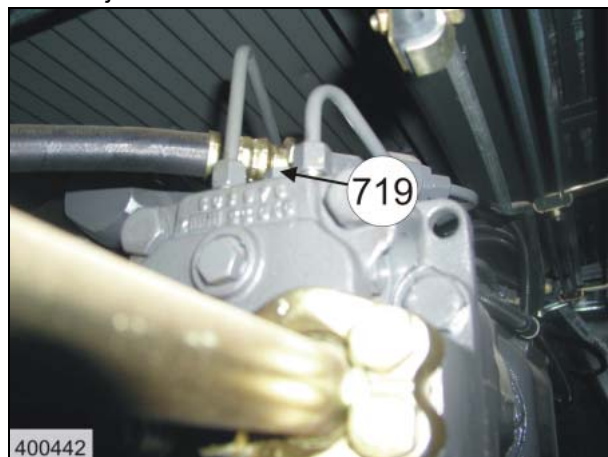




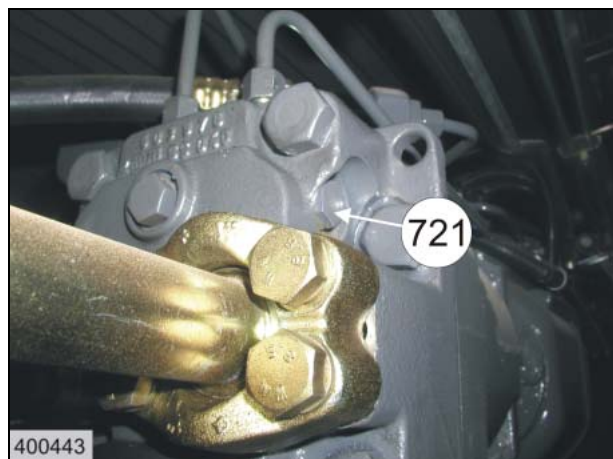
716 – 7 j 20



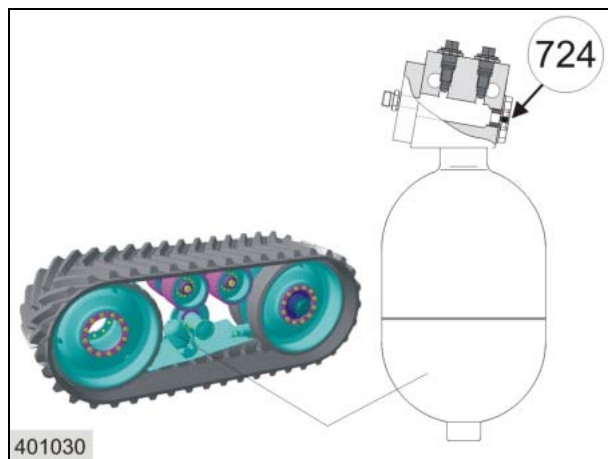
719 – 7 j 20



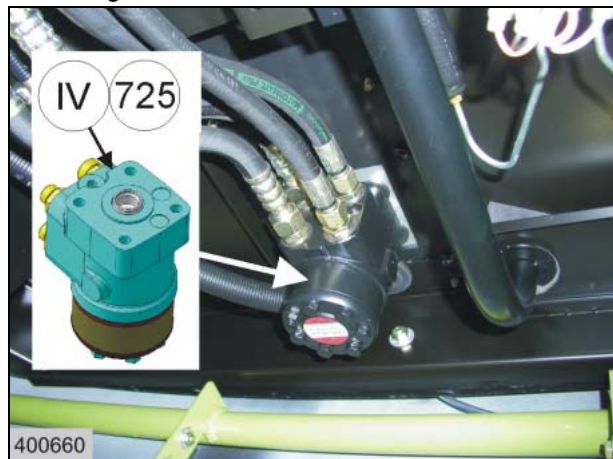
721 – 7 i 19



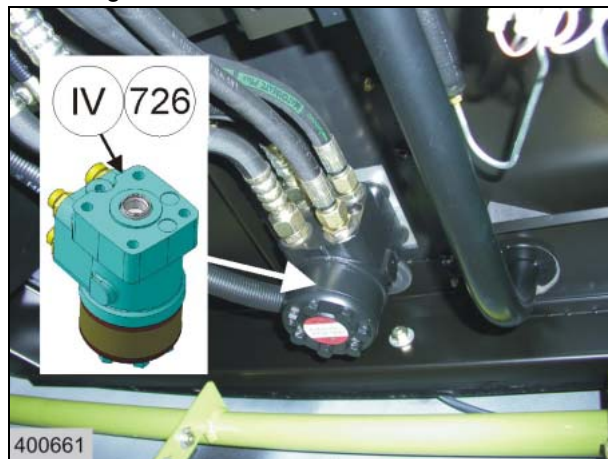
724 – 7 i 21



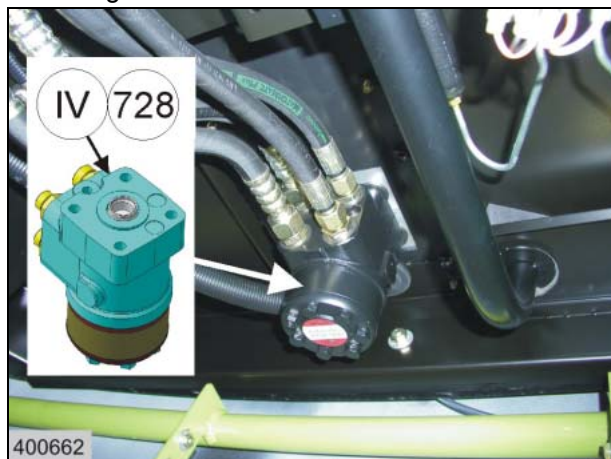
725 – 5 g 18



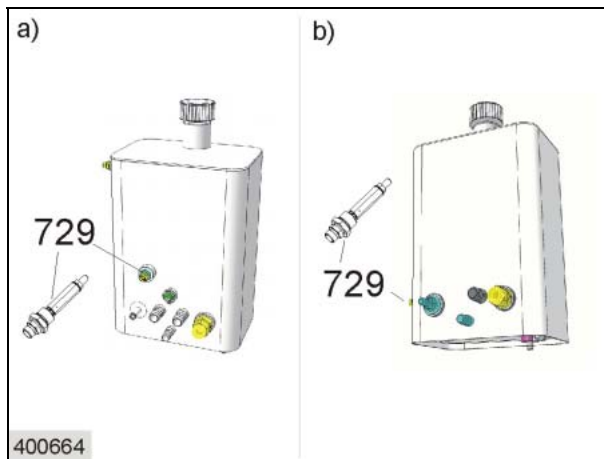
726 – 5 g 18



728 – 5 g 18



729 – 1 o 20



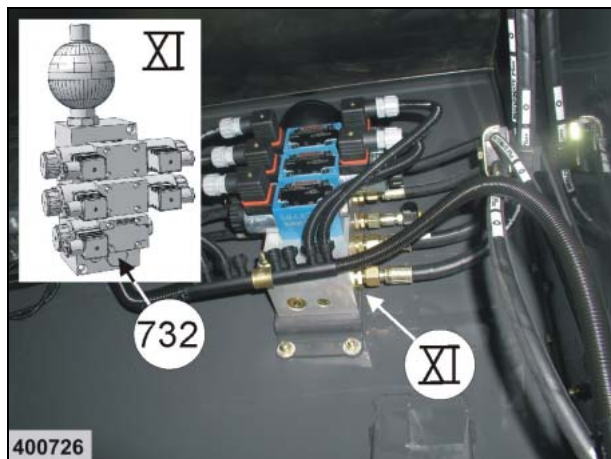
731 – 3 p 20



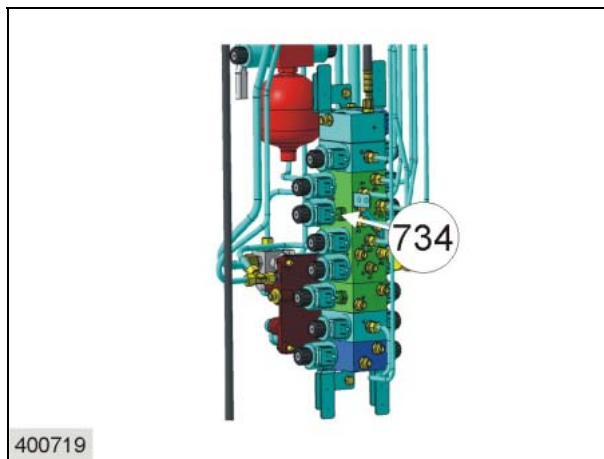
732 – 6 m 19



732 – 5 m 19

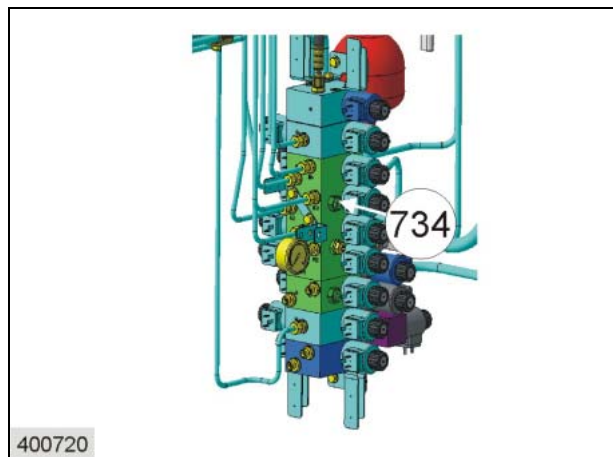


734 - 5 m 19

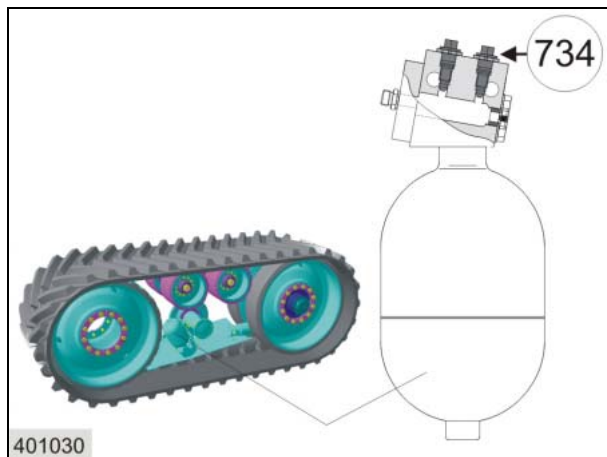




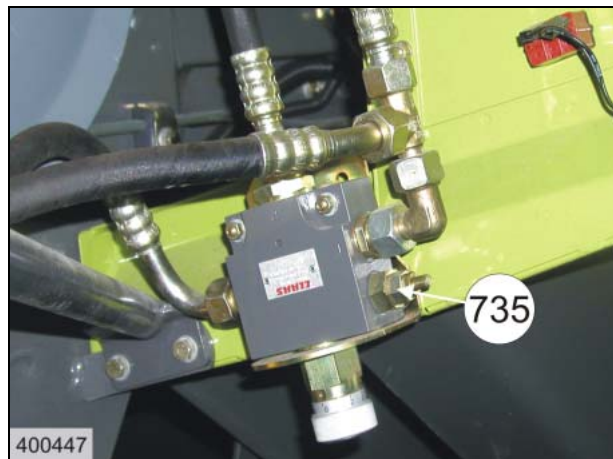
734 - 5 m 19



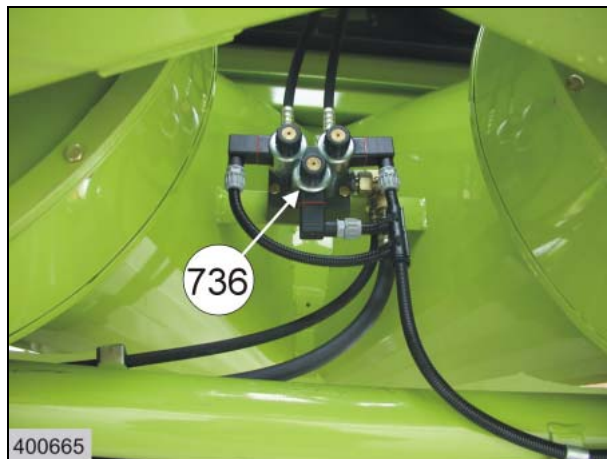
734 - 7 i 21



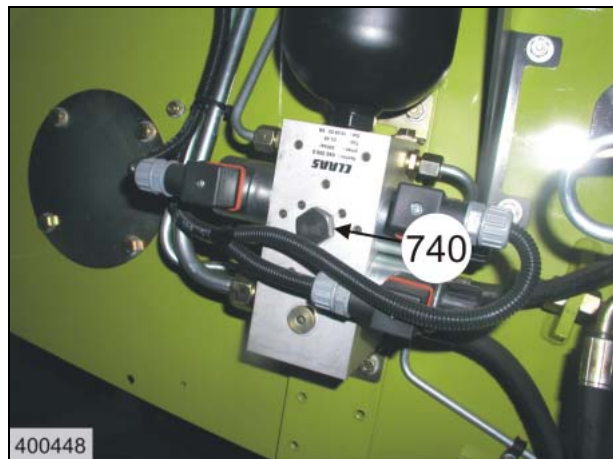
735 - 5 r 20



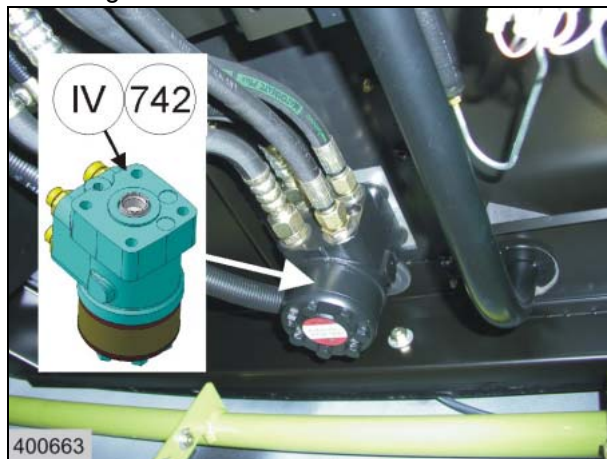
736 - 7 u 18



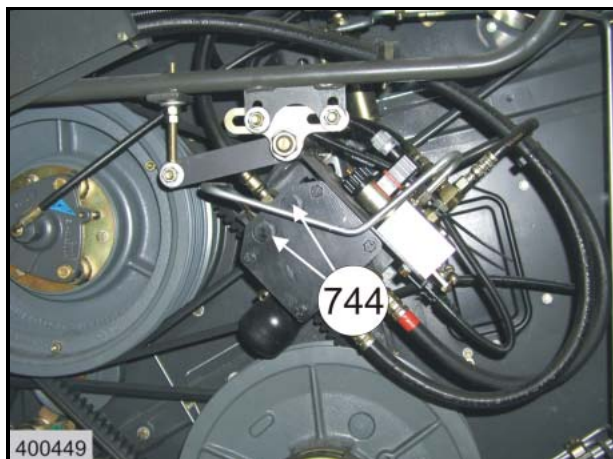
740 - 7 f 17



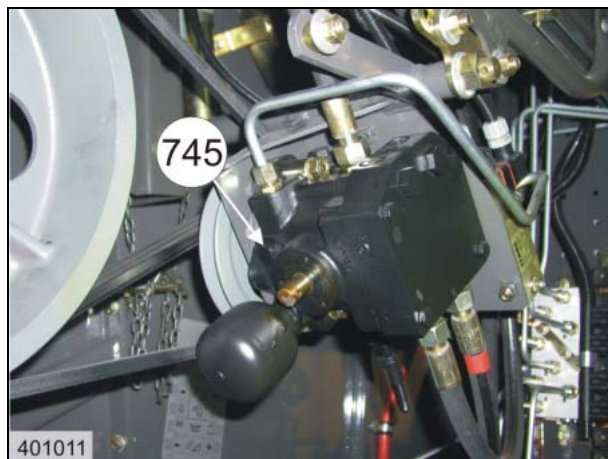
742 - 5 g 18



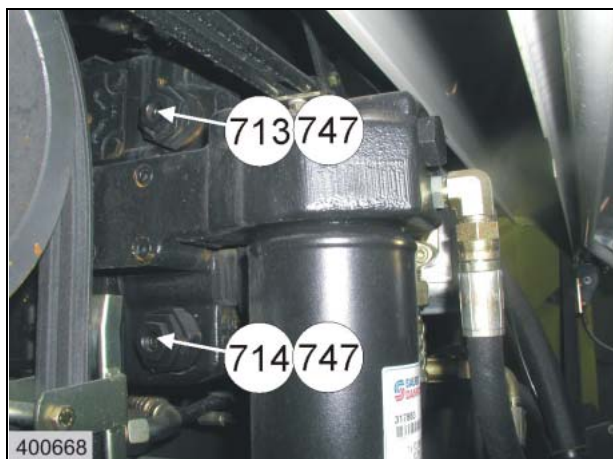
744 – 5 l 19



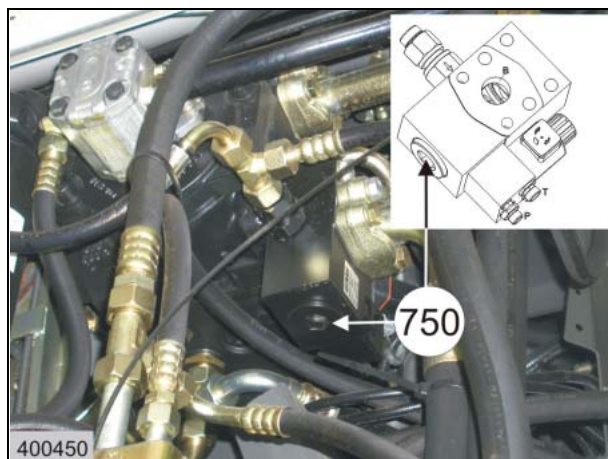
745 – 5 l 19



747 – 3 o 19



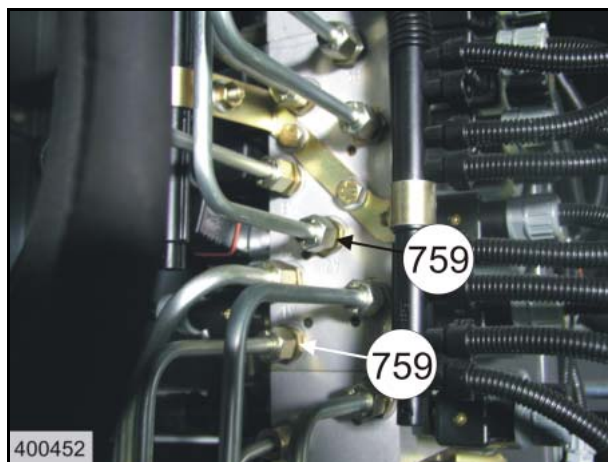
750 – 3 o 19



751 – 3 o 19



759 – 5 m 19





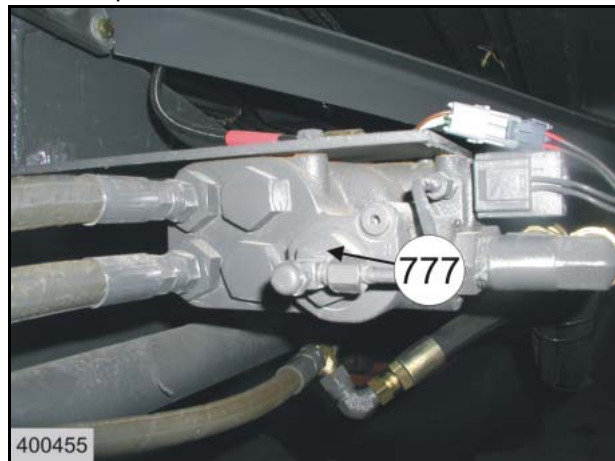
760 – 3 m 20



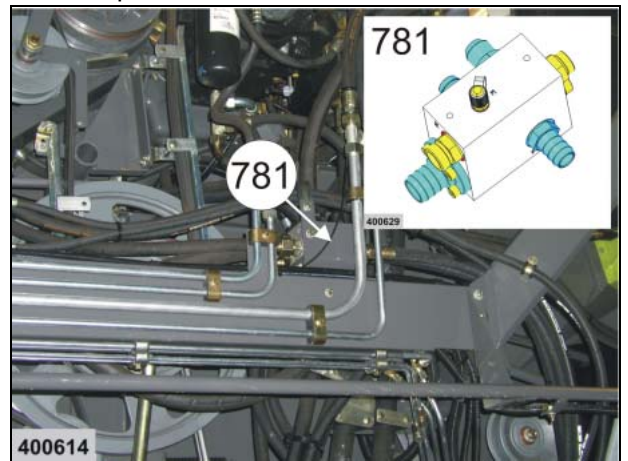
776 – 7 f 17



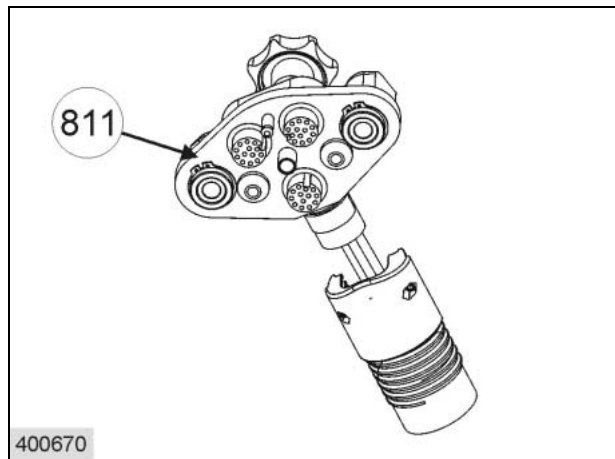
777 – 7 q 18



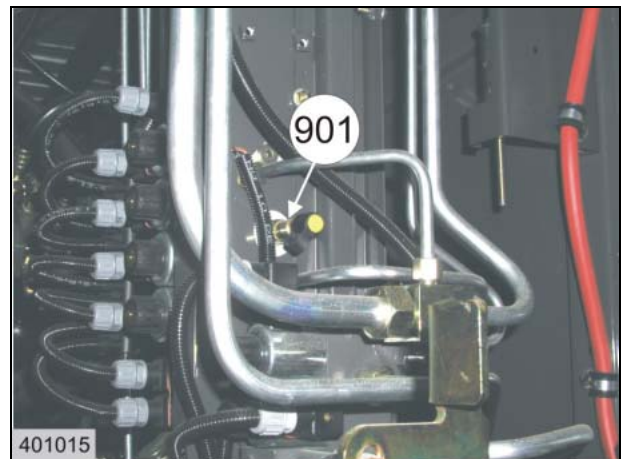
781 – 4 q 19



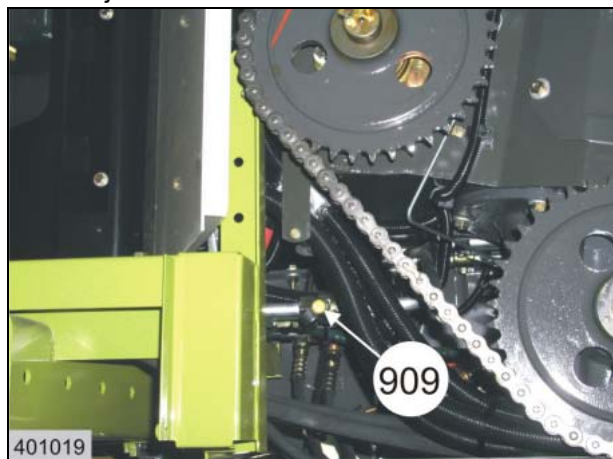
811 – 7 f 19



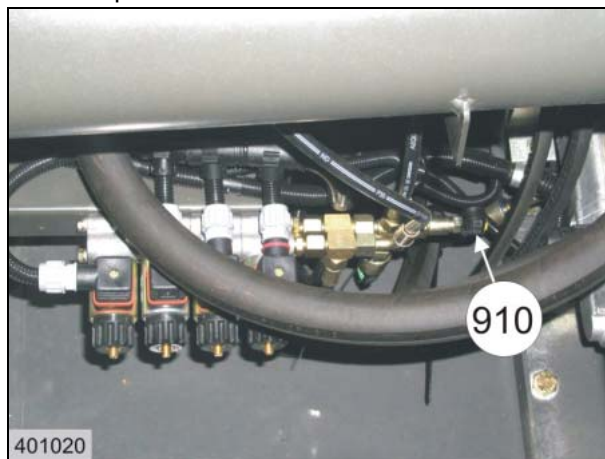
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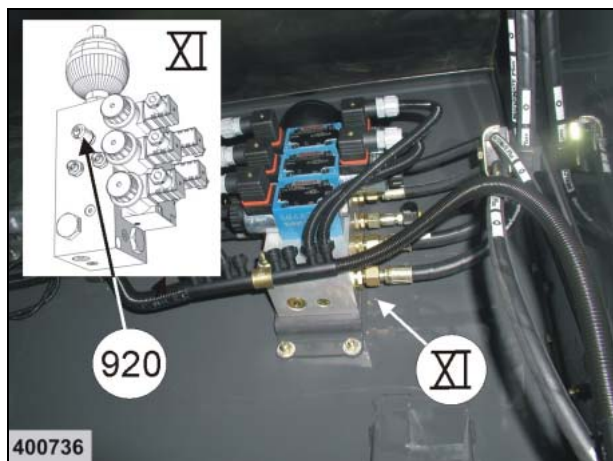
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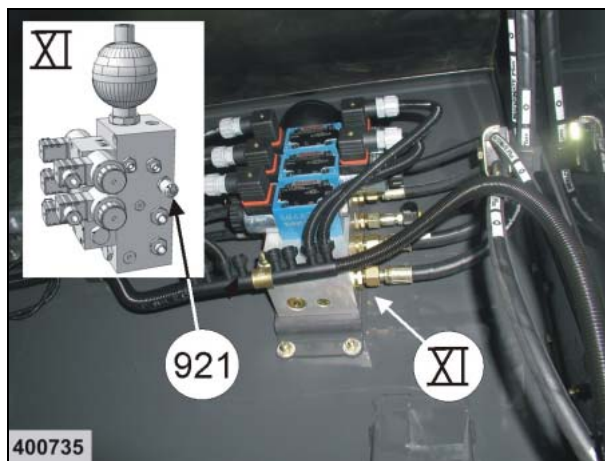
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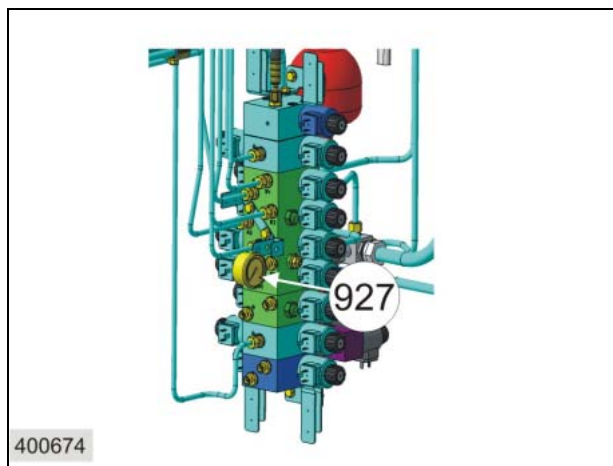
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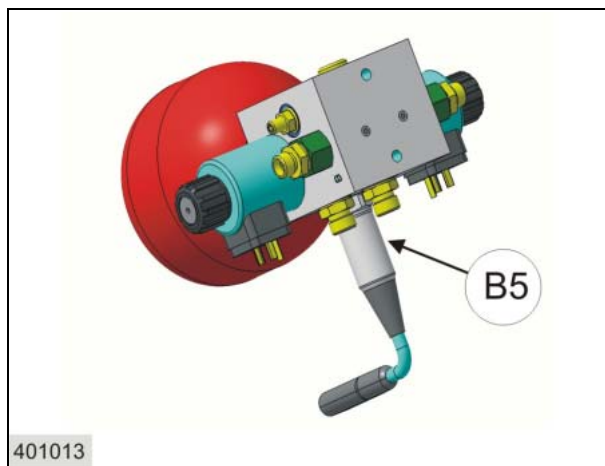
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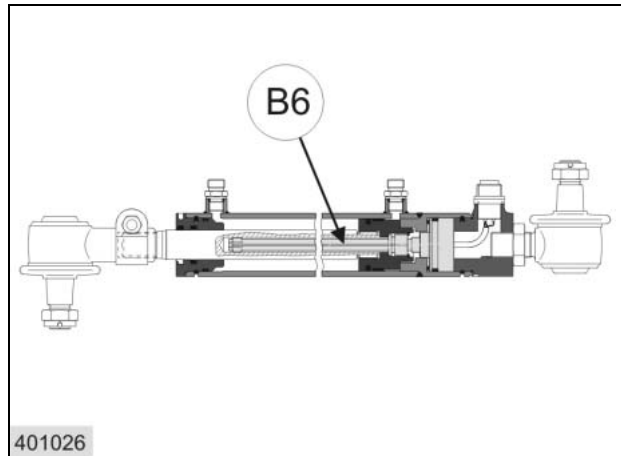


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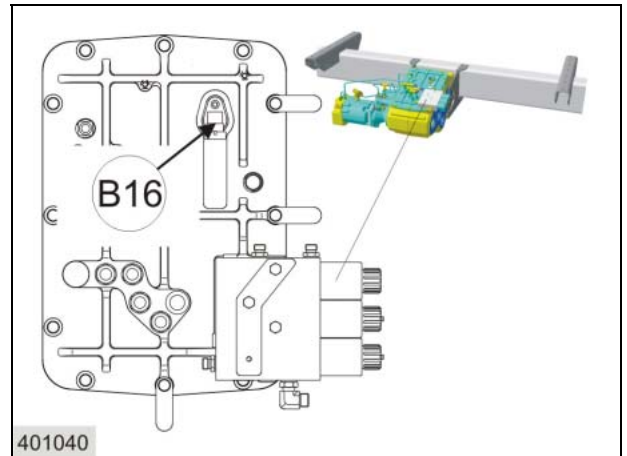




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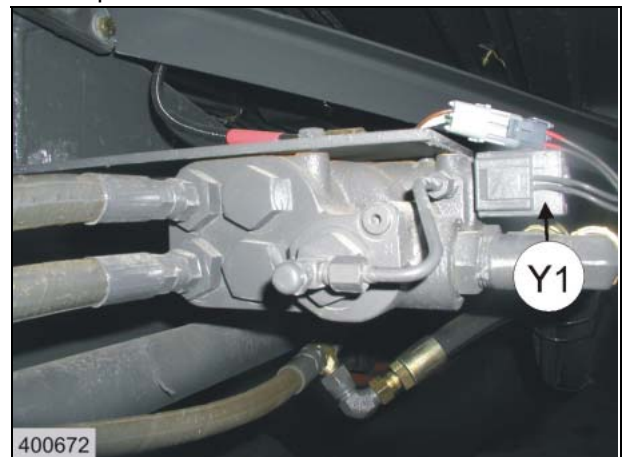
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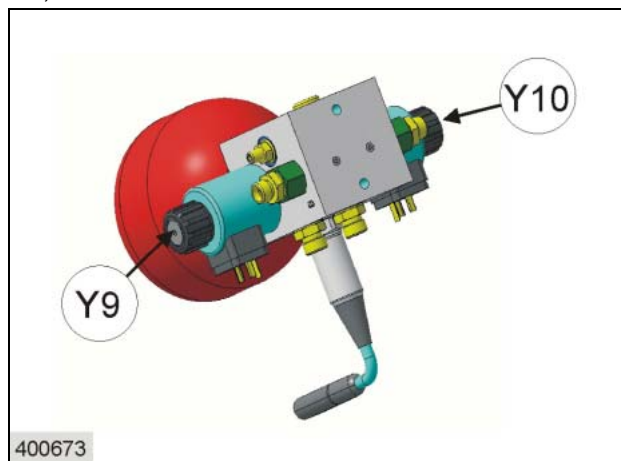
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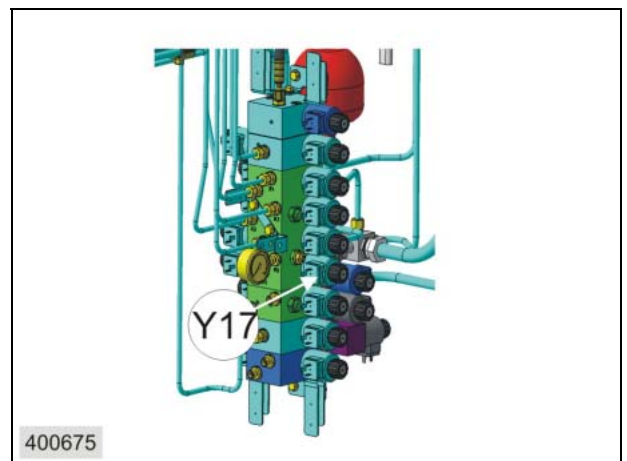
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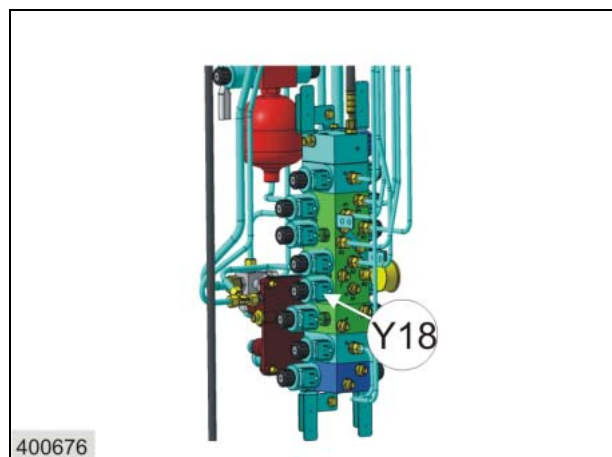
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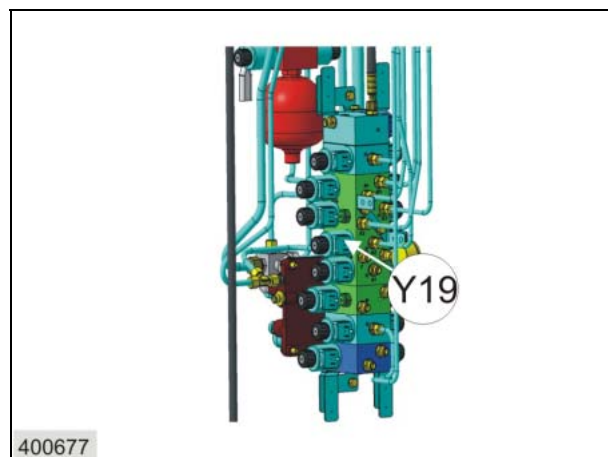
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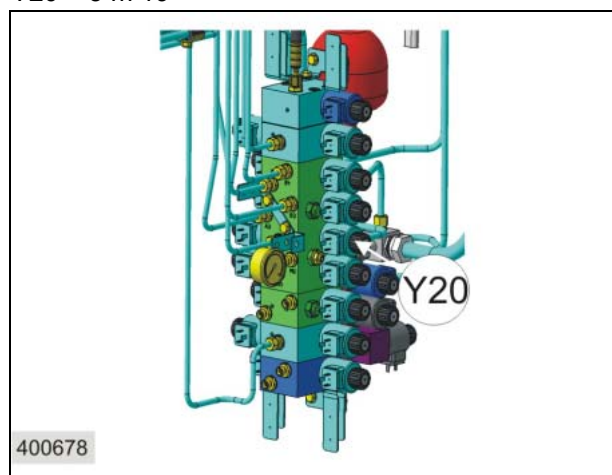
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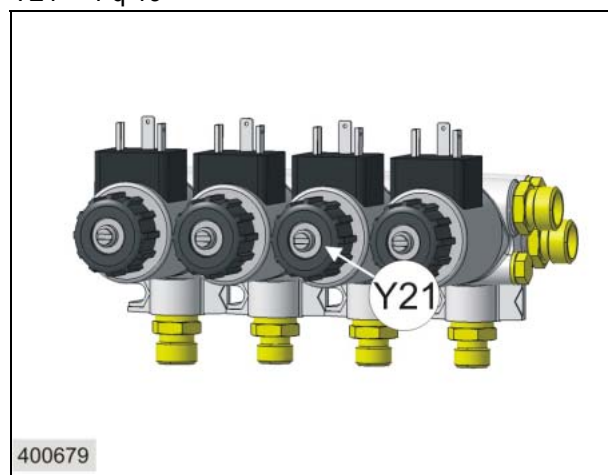
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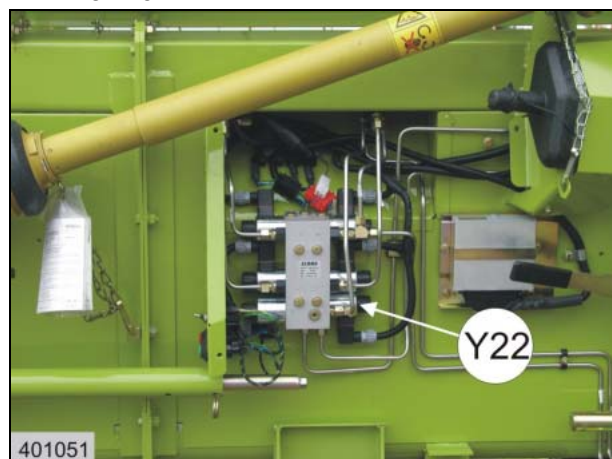
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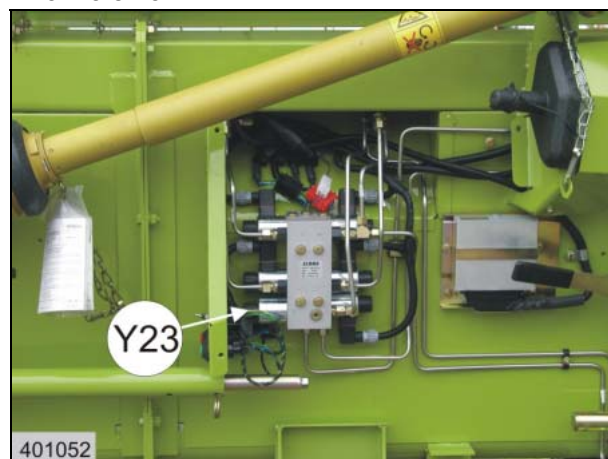
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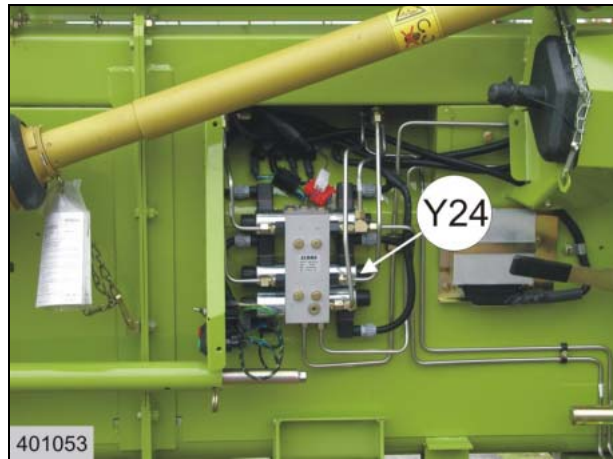
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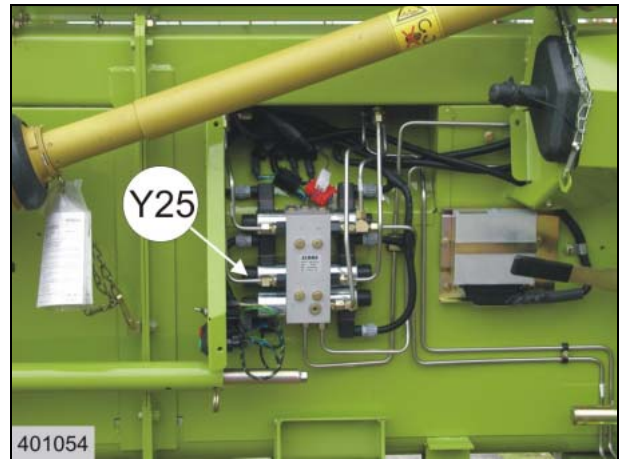
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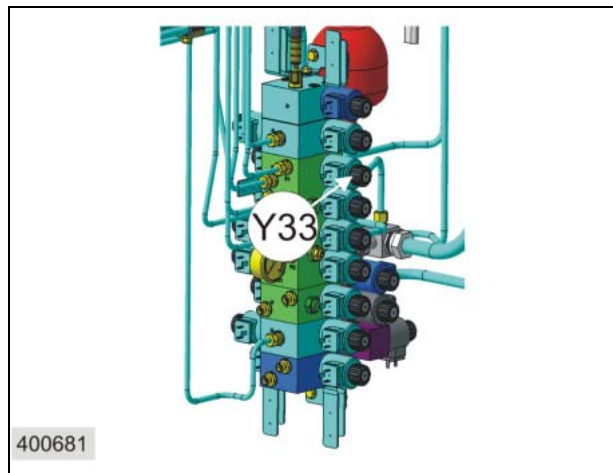
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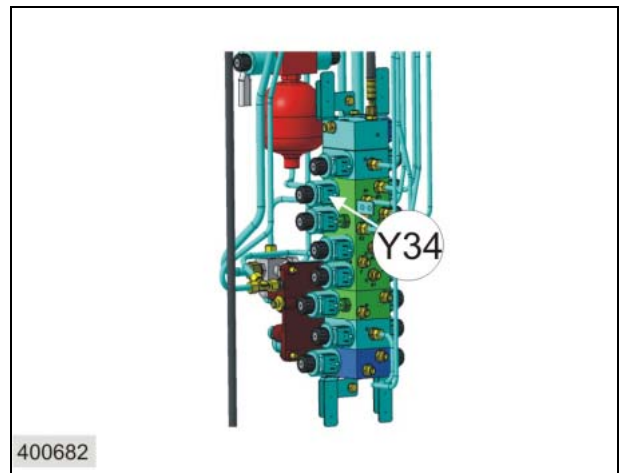
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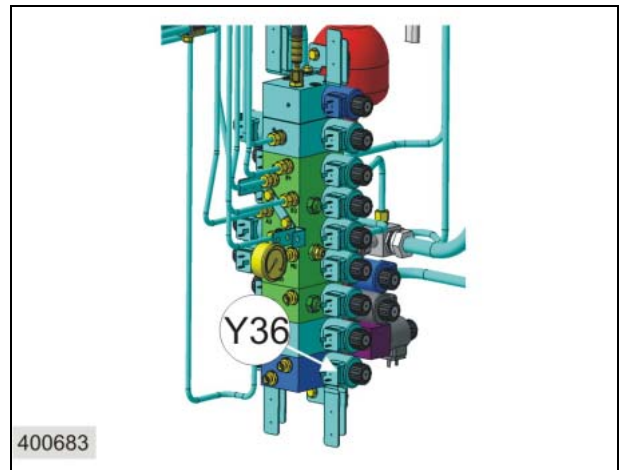
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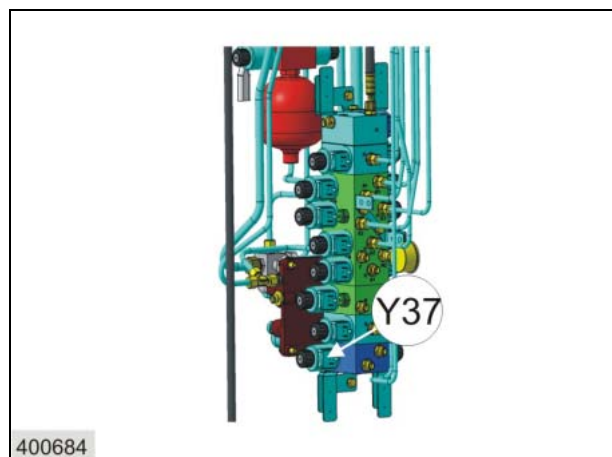
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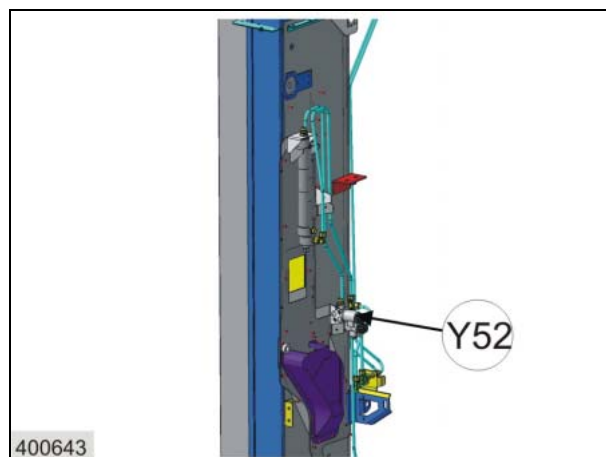
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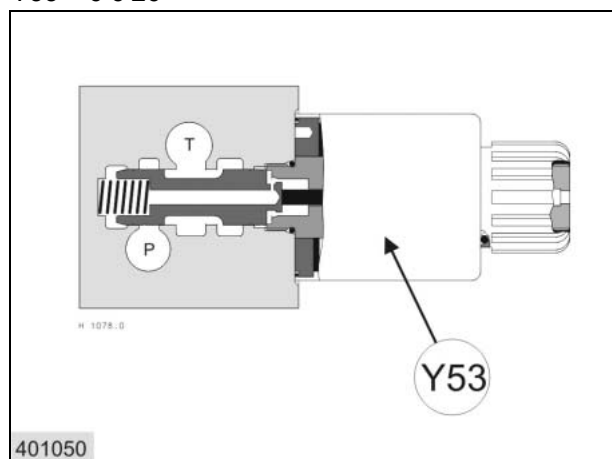
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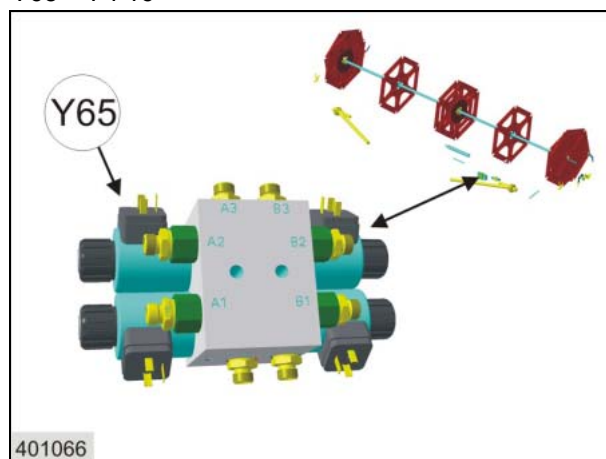
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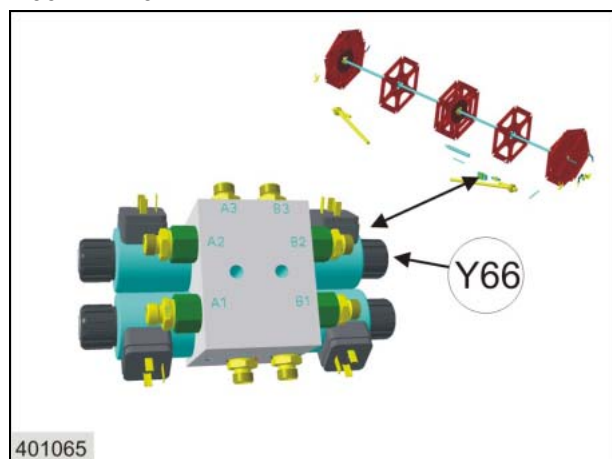
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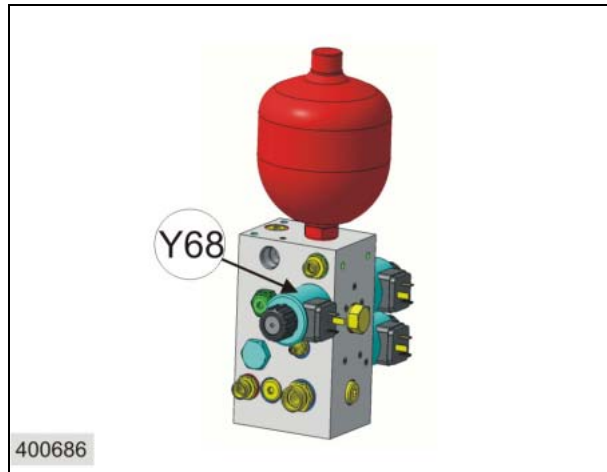


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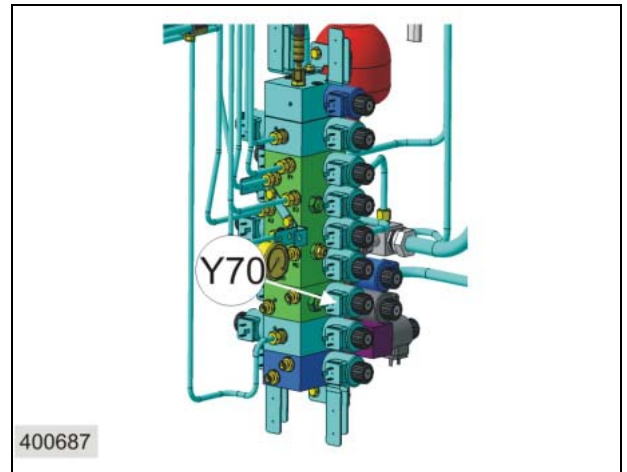




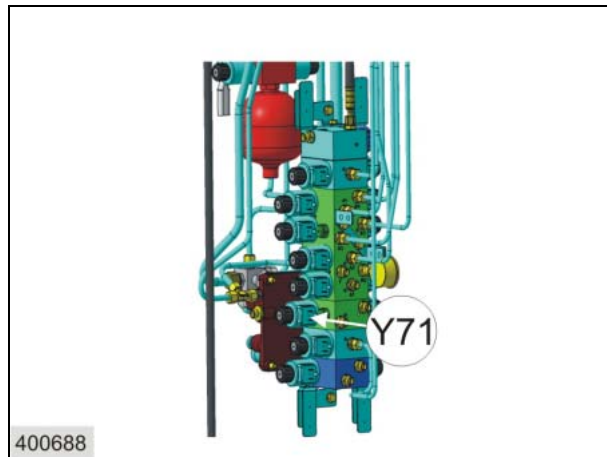
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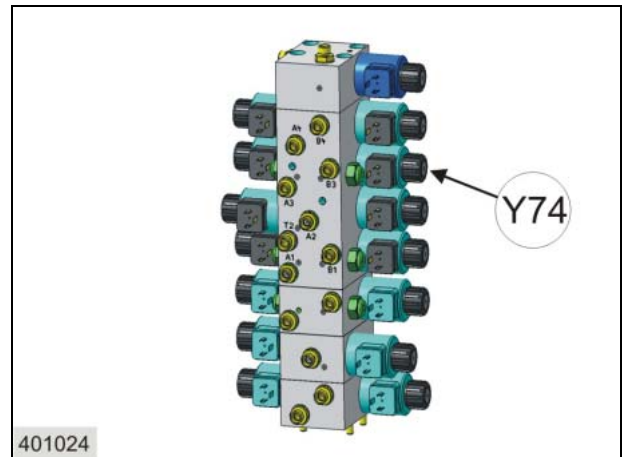
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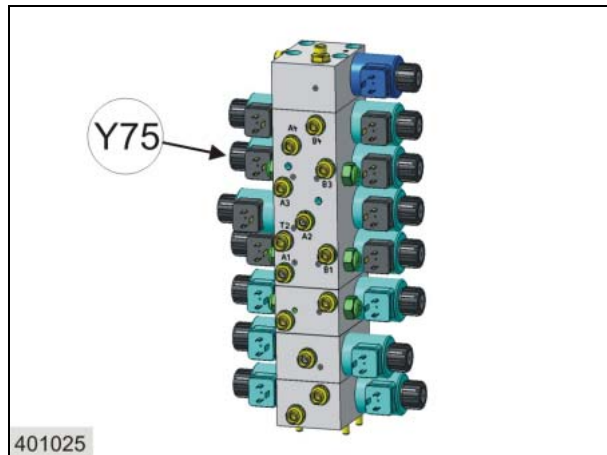
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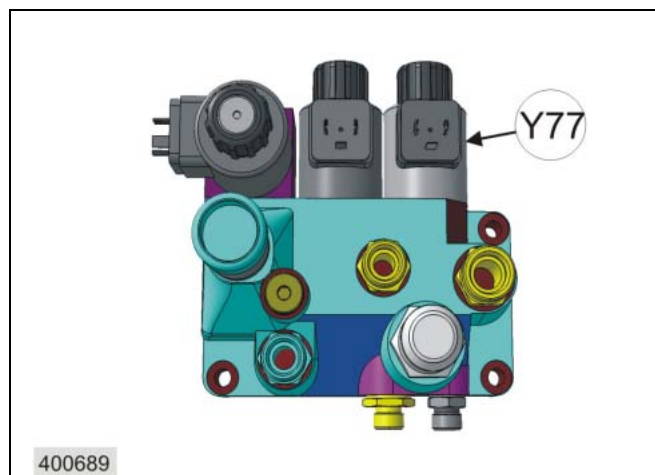
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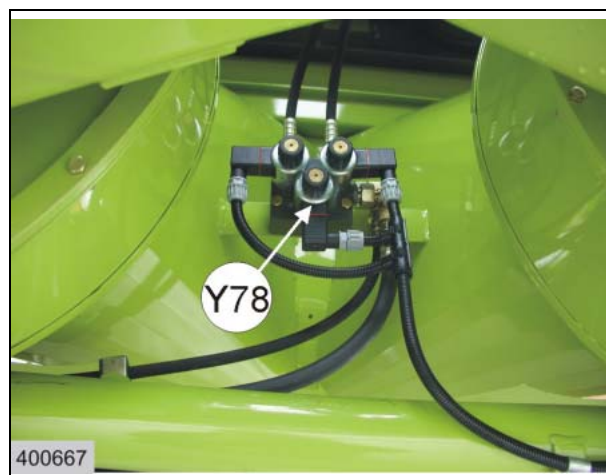
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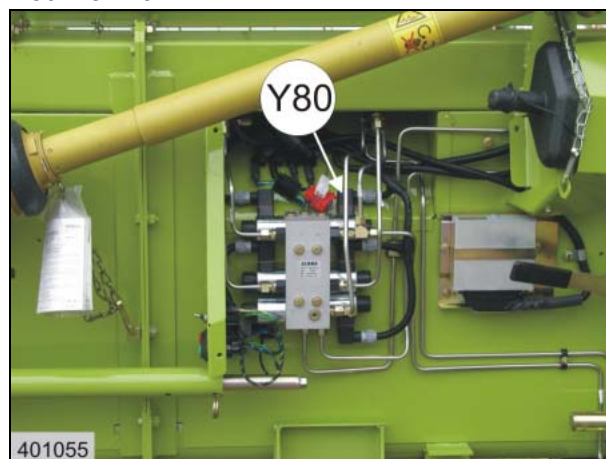
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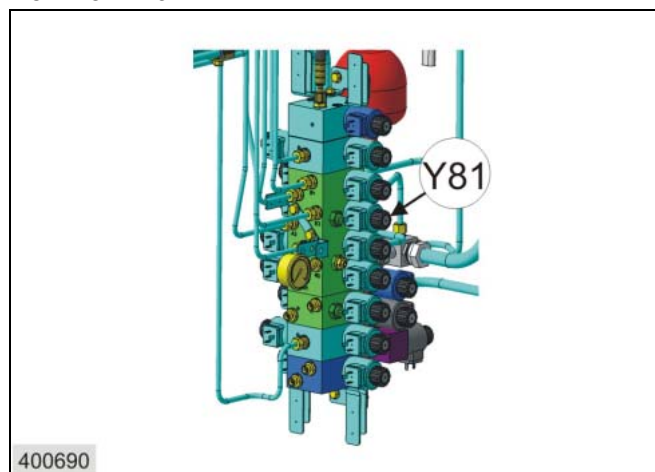
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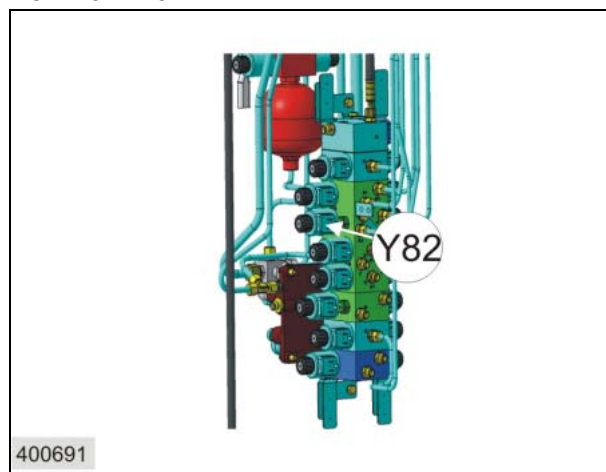
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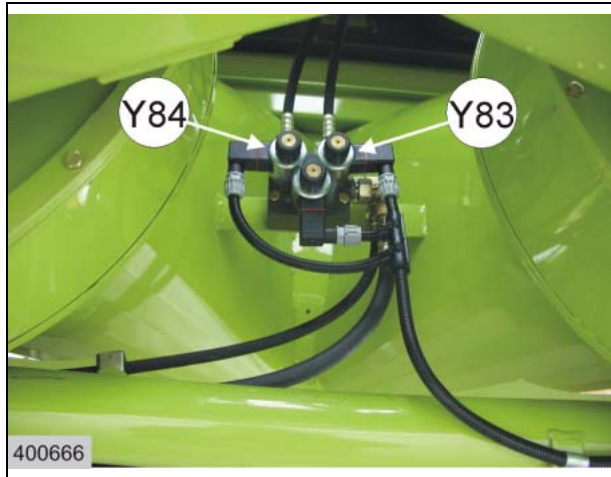
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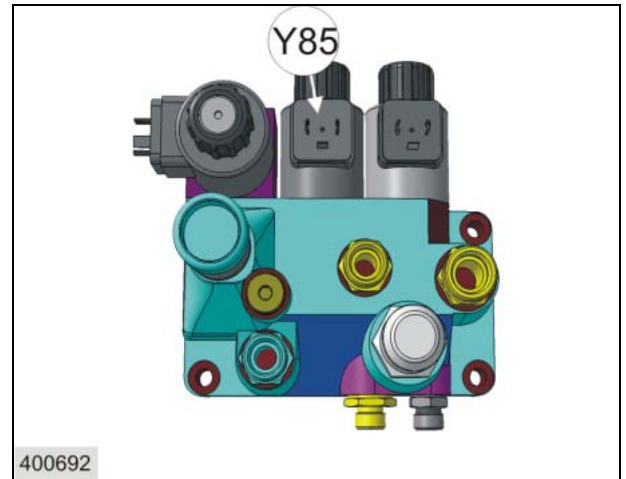
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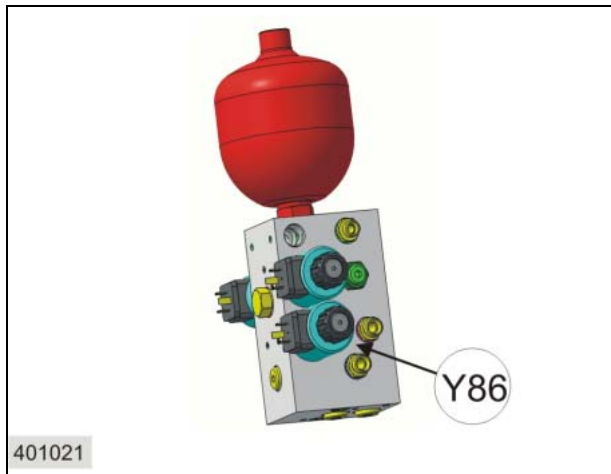
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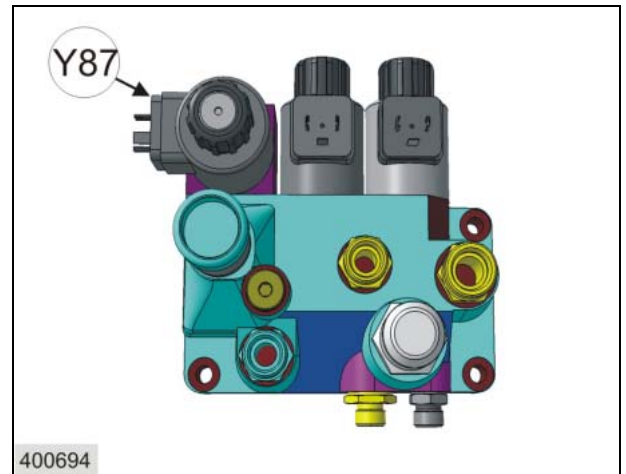
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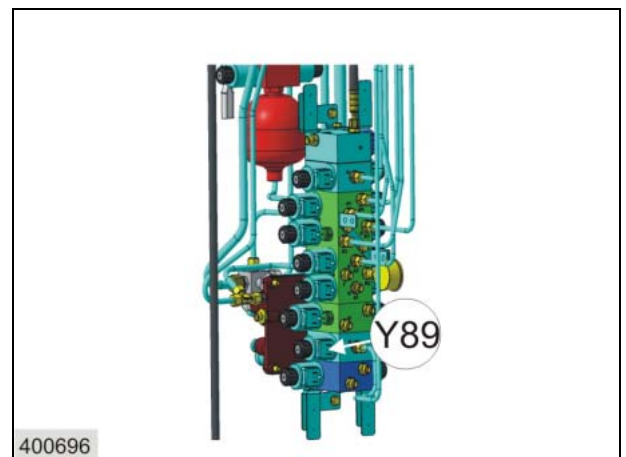
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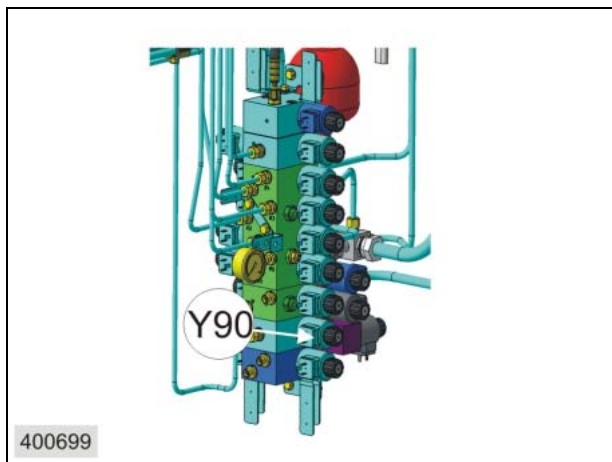
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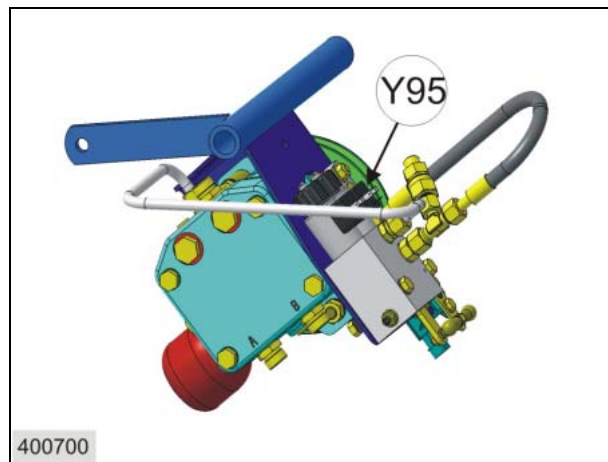
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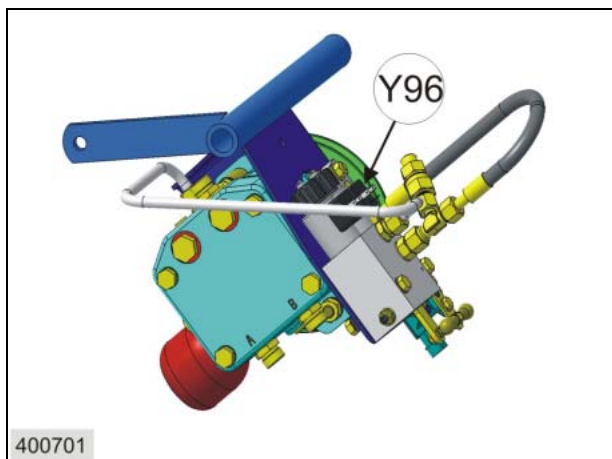
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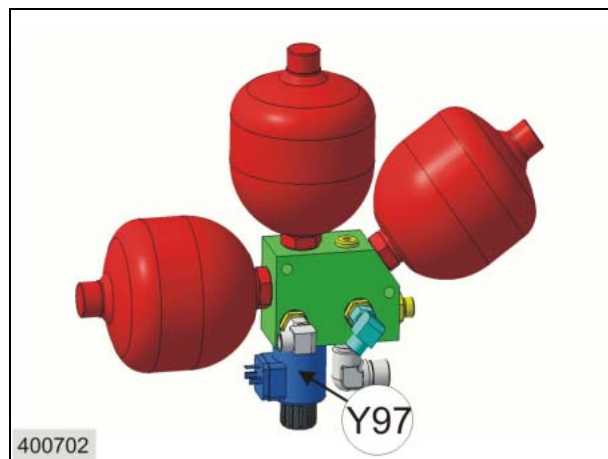
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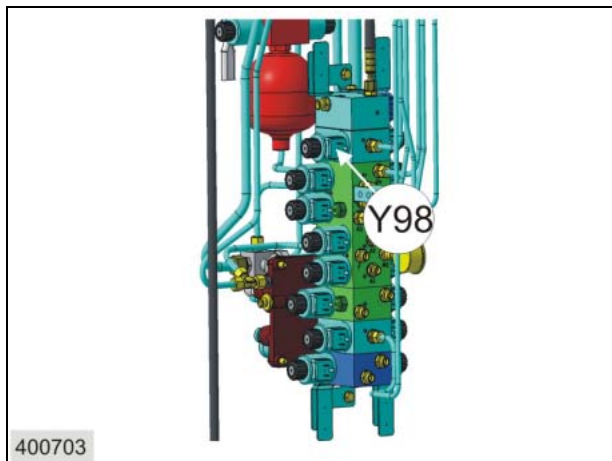
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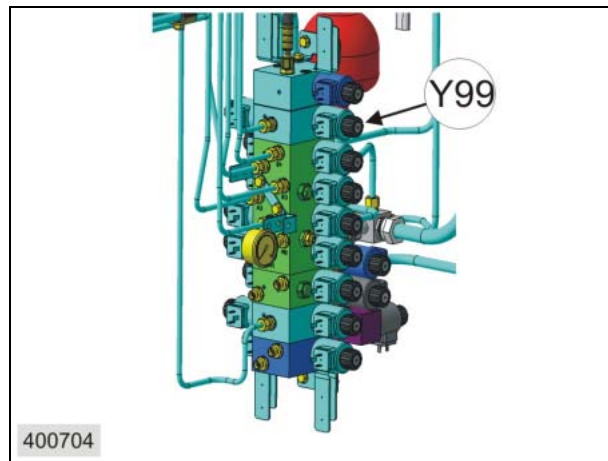
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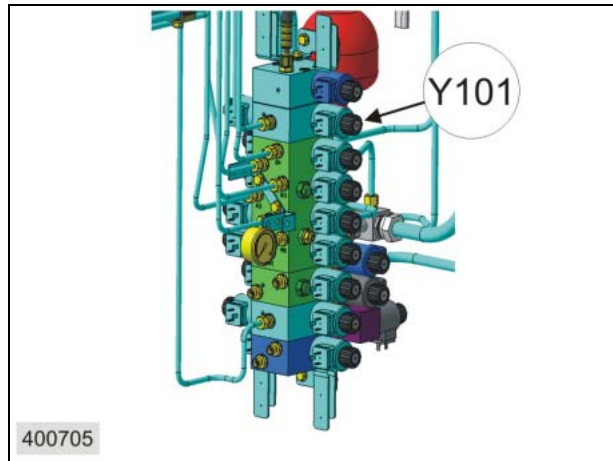


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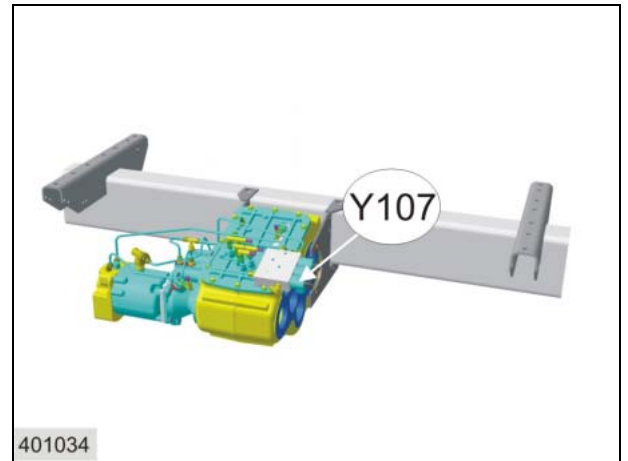




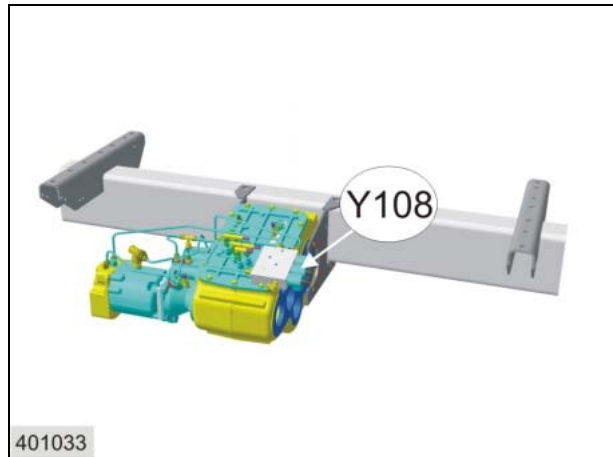
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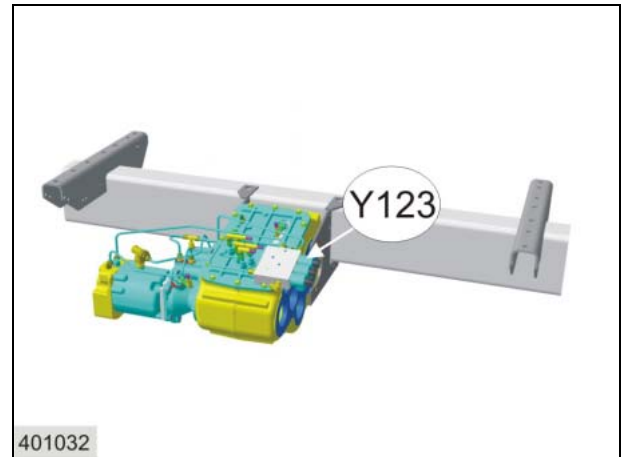
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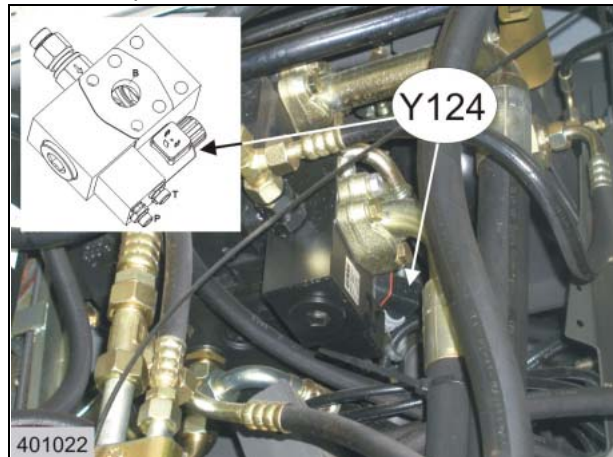
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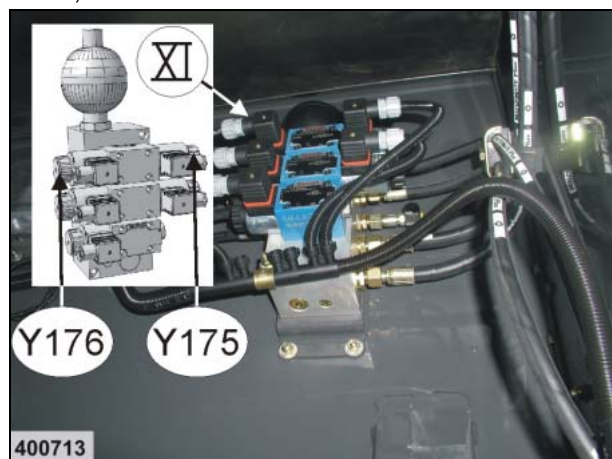
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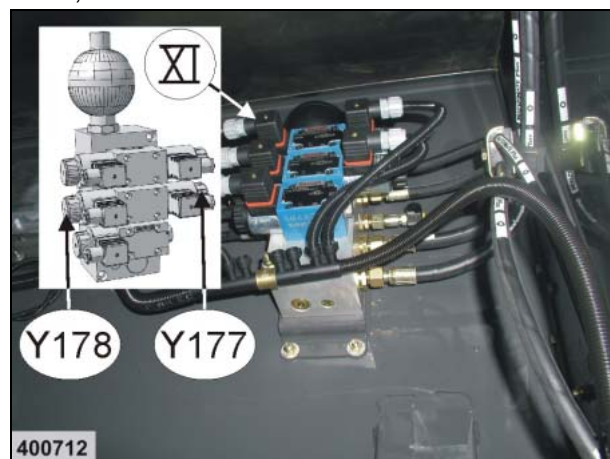
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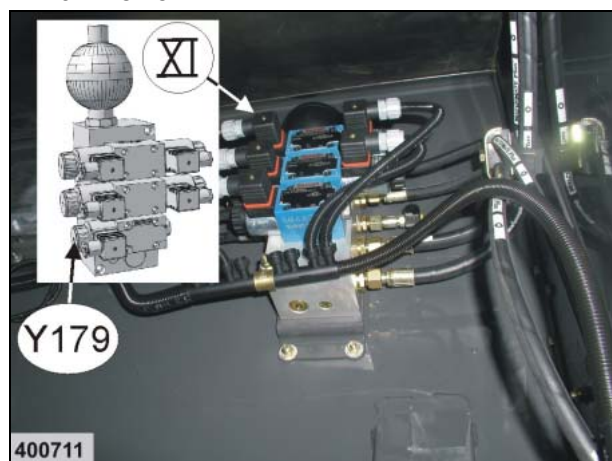
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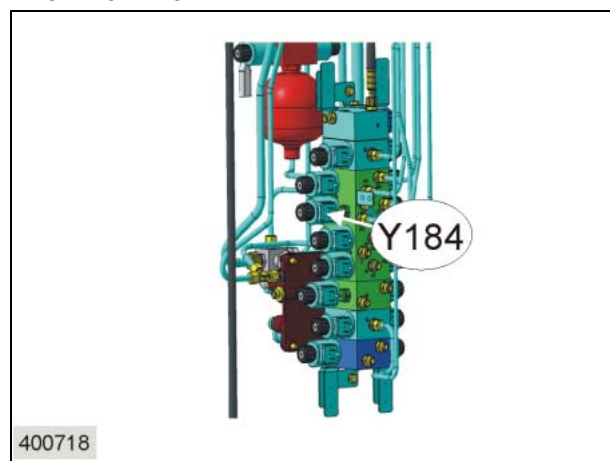
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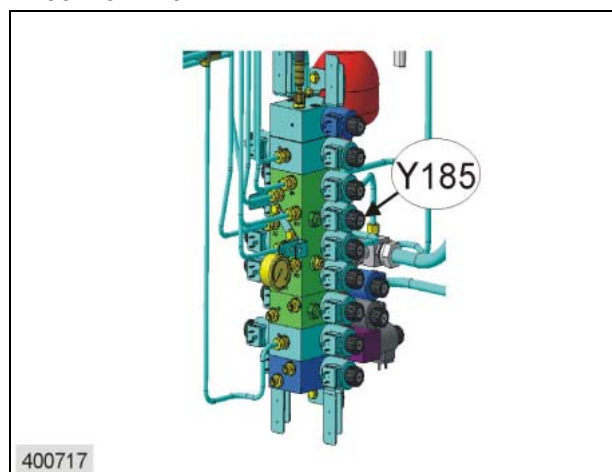
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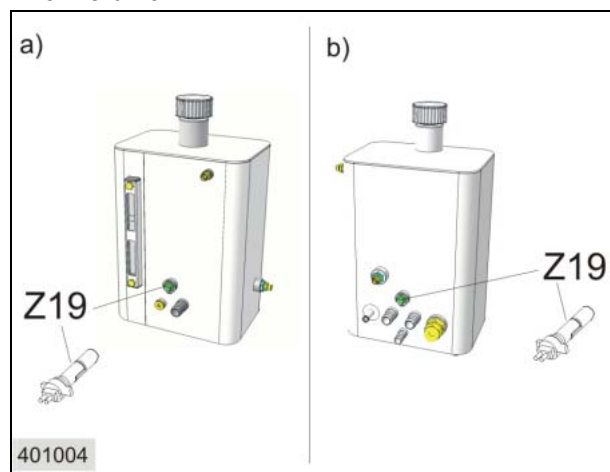
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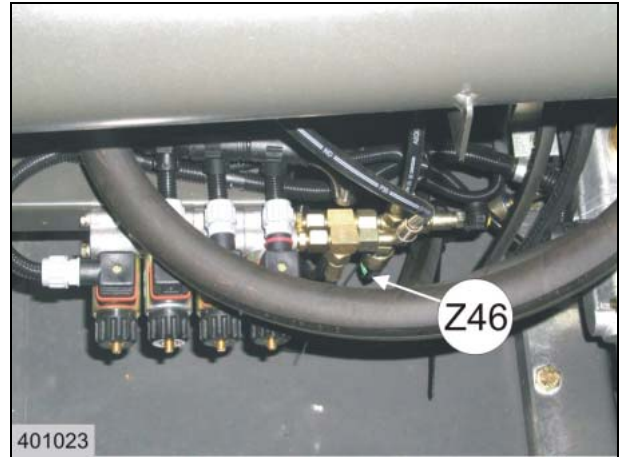
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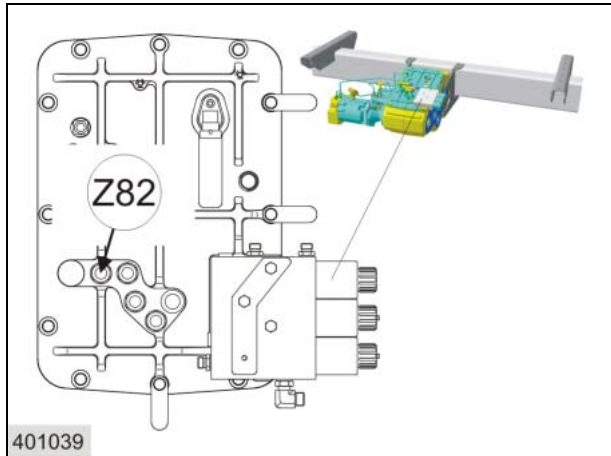
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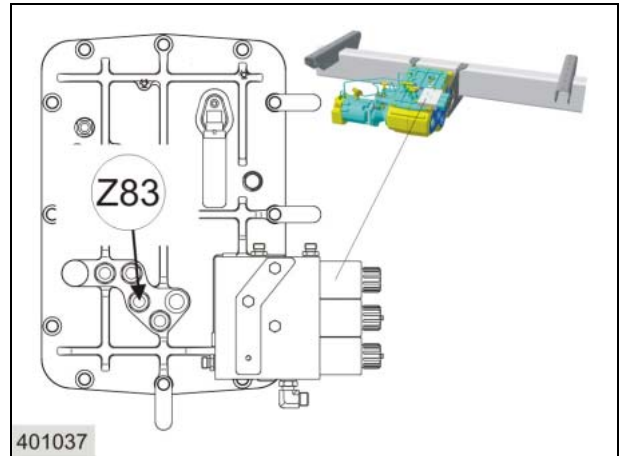
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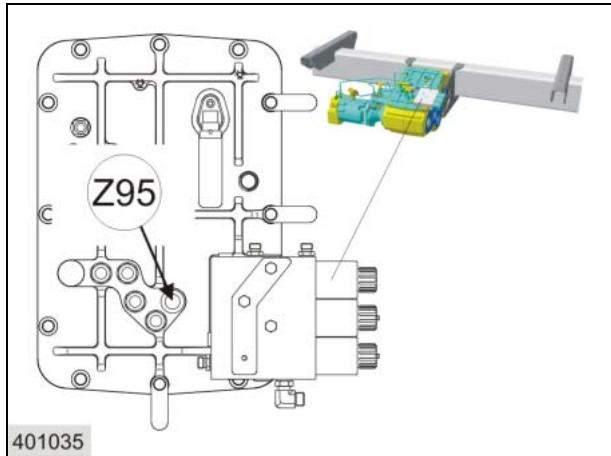
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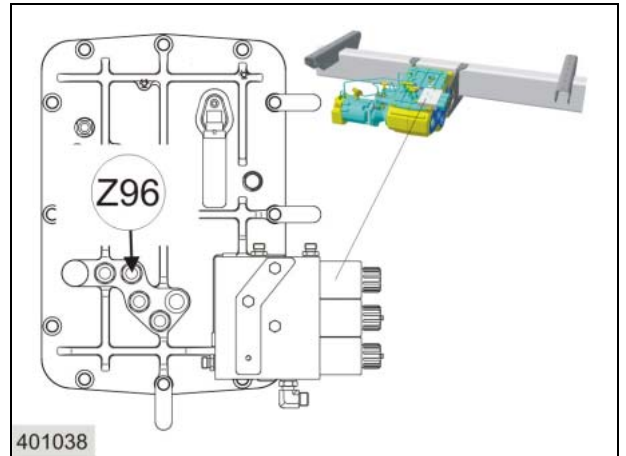
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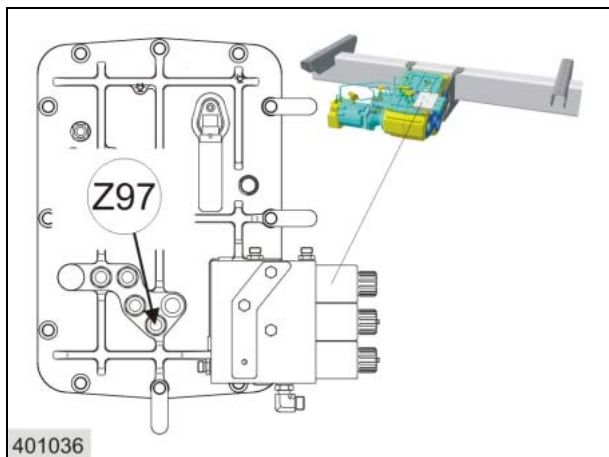
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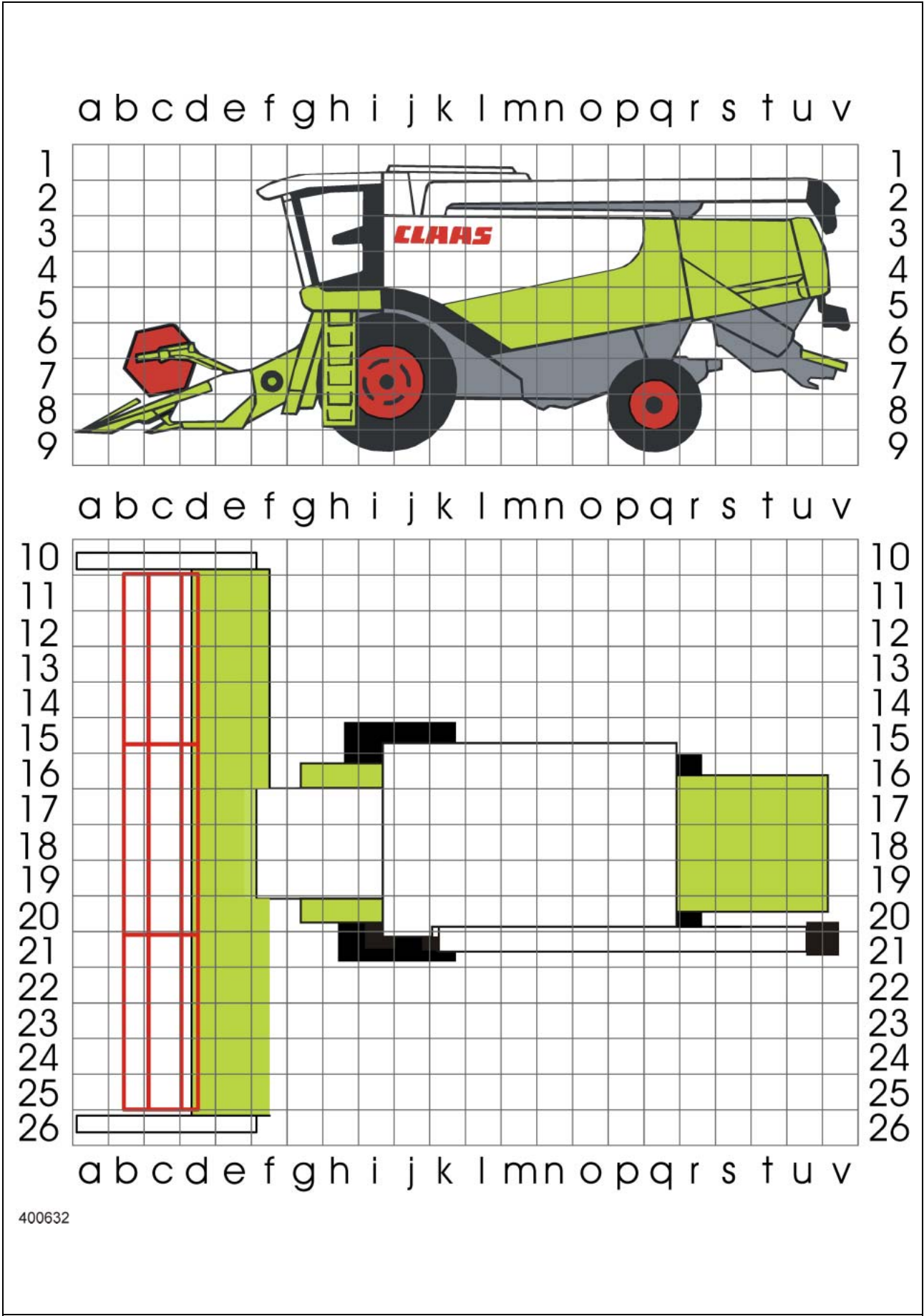




## Component grid



Component grid







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